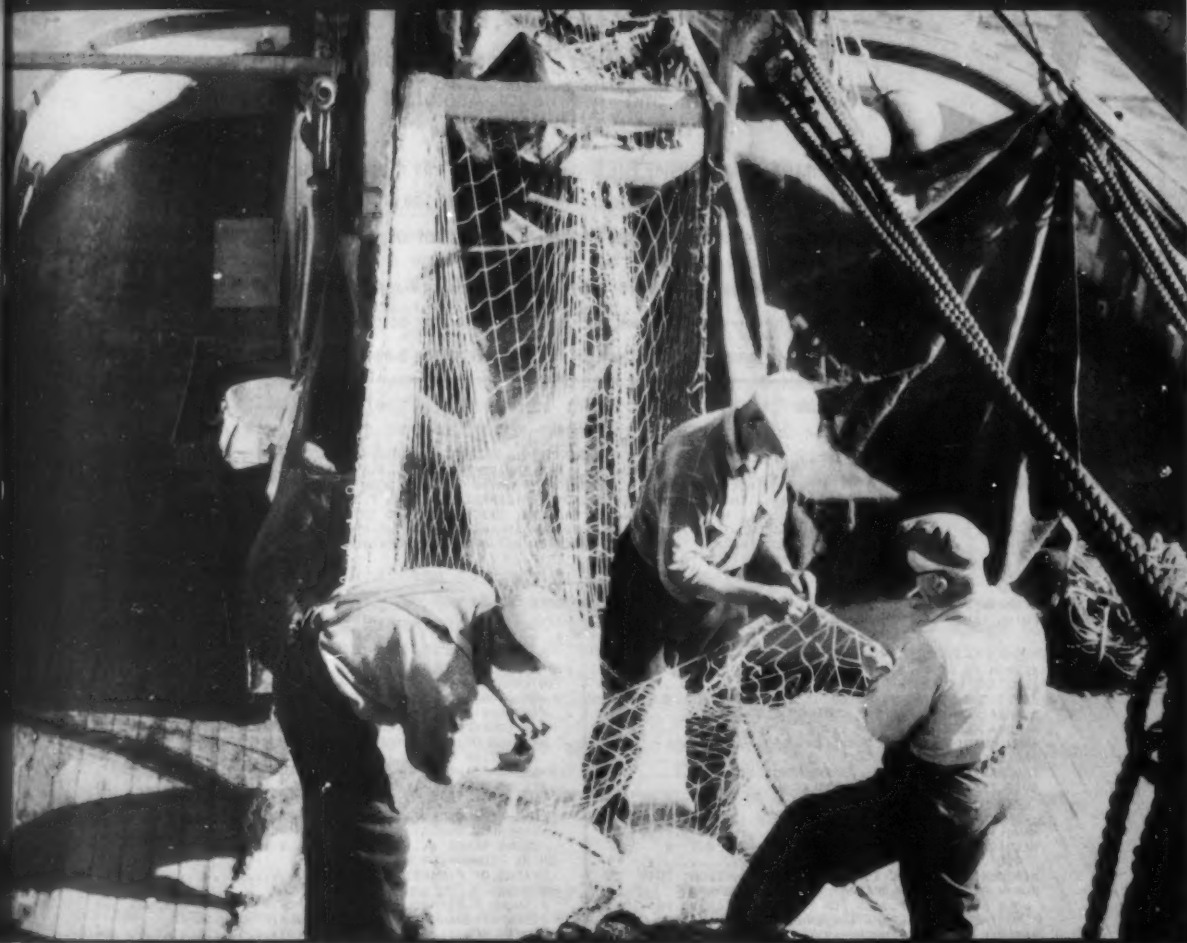


COMMERCIAL FISHERIES REVIEW



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COMMERCIAL FISHERIES REVIEW



A REVIEW OF DEVELOPMENTS AND NEWS OF THE FISHERY INDUSTRIES
PREPARED IN THE BRANCH OF COMMERCIAL FISHERIES

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PRELIMINARY REPORT ON 1950 NORTH PACIFIC ALBACORE TUNA EXPLORATIONS OF THE JOHN N. COBB

By Donald E. Powell*

INTRODUCTION

In a continuation of work begun in 1949, the U. S. Fish and Wildlife Service exploratory fishing vessel, John N. Cobb, spent more than 3½ months, from June 12 to September 28, 1950, exploring for albacore tuna and testing various gear in the offshore waters of Oregon, Washington, British Columbia, and Alaska. Objectives of the fishing explorations were to obtain information on the inshore migration pattern of the tuna as they approach the commercial fishing areas; to determine if albacore reach Alaskan waters in commercial quantities (in 1949, the Oregon found a few scattered tuna up to 300 miles off Dixon Entrance; Powell and Hildebrand 1950); and to test various types of gear (including surface-trolled jigs, gill nets, and long line) as to their effectiveness in catching albacore. Oceanographic and biological observations were recorded; such as, water temperatures, salinity samples, lengths and weights, and feeding habits of tuna taken during the fishing operations. Radio communication was maintained with the commercial fleet, and information on fish movements and water temperatures was broadcast daily.

METHODS AND RESULTS OF EXPLORATORY FISHING

Since the inception of the fishery in offshore waters of Oregon and Washington in 1937, albacore have, in an average year, been first taken in the latter part of June or early July at various places off the Oregon coast; but little is known of the origin and migration pattern of the fish. In planning the early scouting operations of the John N. Cobb, water temperature was considered as being the main ecological factor which might indicate the appearance of tuna off the Northwest Coast. Examination of existing surface-water temperature records showed that the 57.5° F. isotherm should be found to reach as far north as Cape Blanco, Oregon, at a distance of 400-500 miles offshore by the middle of June. The plan was to fish along the edge of this warm-water bulge as it moved northward and shoreward, with the purpose of intercepting incoming schools of albacore and tracing their movements into the areas of commercial fishing.

The John N. Cobb left Seattle on June 12 and steered a general southwest course from Cape Flattery. While on this course, surface water temperatures were found to be cold (52° to 54° F.) past the mouth of the Columbia River and south, but a general warming of the water was noted 300 miles off the southern Oregon coast. On the evening of June 17, 58° F. water was encountered and the following morning the first albacore were caught on trolled jigs at a position 42°12' N. latitude, 135°05' W. longitude, approximately 480 miles off Cape Blanco, Oregon. The fish struck at intervals, usually in pairs, over a period of several hours, but no large concentration was found at this time. Several days later, on June 23, 24, and 25, tuna were found 200 miles closer to shore but still in small scattered groups.

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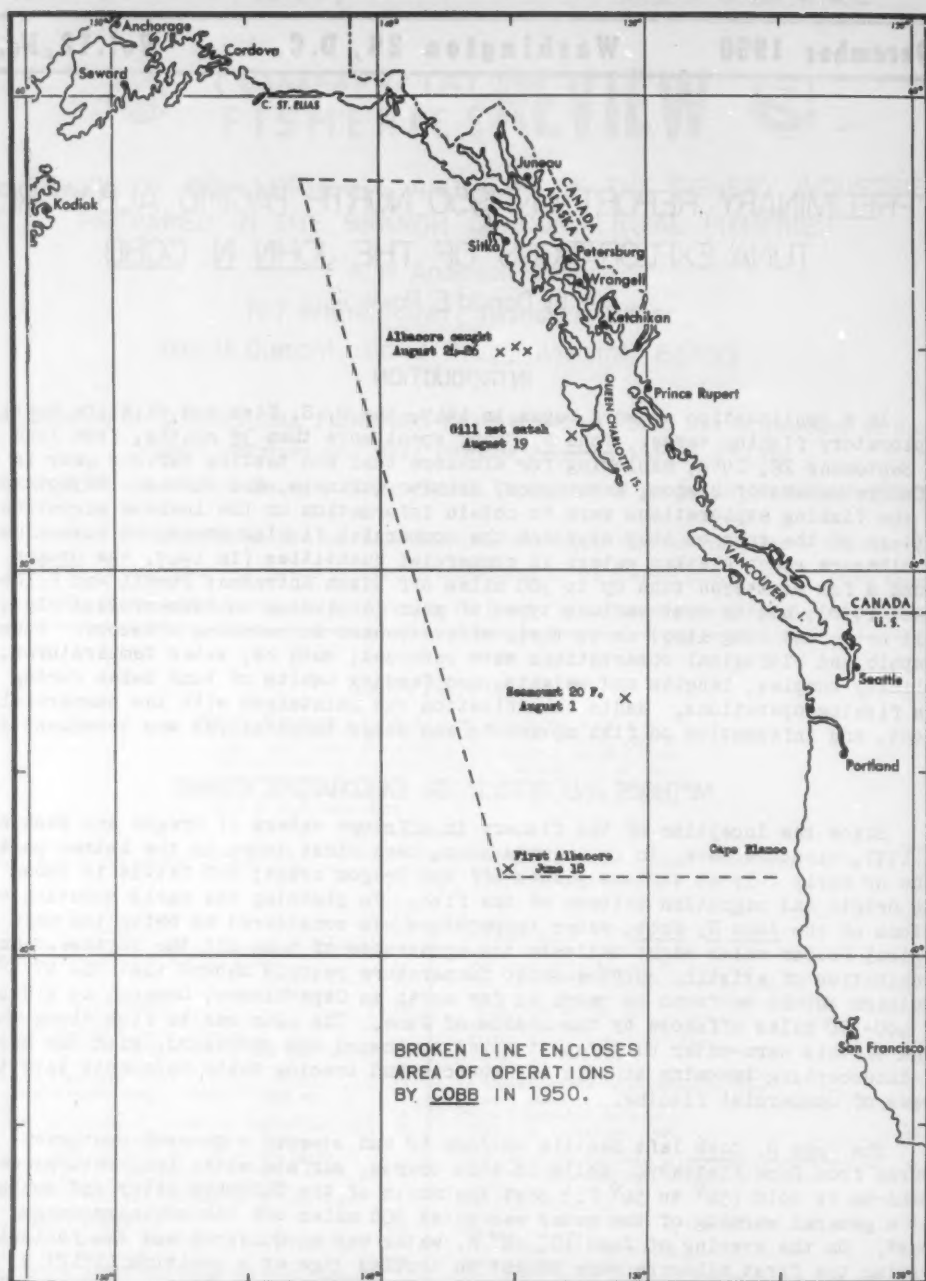


FIGURE 1 - CHART OF THE NORTHEASTERN PACIFIC.

A relatively rapid warming of the surface water off the Oregon coast was noted during the last of June and the first few days of July; temperatures of 59° F. were found within 35 miles of the mouth of the Columbia River on July 3. Between July 7 and 14 the first signs of schooling were noted, and a series of fishing efforts from Cape Blanco north to Grays Harbor, Washington, at distances of 50 to 120 miles offshore indicated the albacore were widely scattered off the entire Oregon and southern Washington coasts. During this time, the commercial fishing fleet began to assemble on the grounds, and by July 16 good catches were being made 60 miles S.W. of the Columbia River.

Fishing was excellent during the remaining days of July, good concentrations of albacore being found off Grays Harbor on July 19 and off Cape Flattery during the last few days of July. Exploratory fishing and gear-testing was continued off the Washington and British Columbia coasts until the middle of August when the John N. Cobb headed north to explore the waters of southeastern Alaska for commercial quantities of tuna.

Concentrations of albacore were observed off the Queen Charlotte Islands, where the Canadian fleet experienced good fishing from the middle of August to mid-September. Over two weeks of intensive fishing in Alaskan waters from Dixon Entrance to within



FIGURE 2 - JOHN N. COBB, THE SERVICE'S EXPLORATORY FISHING VESSEL OPERATING IN THE NORTH PACIFIC.

100 miles of Cape St. Elias and up to 300 miles offshore indicated no evidence of tuna in quantities of commercial significance. A few scattered albacore were taken north of Dixon Entrance, but water temperatures were cold (as low as 51° F.) over most of the area covered, and stormy weather curtailed fishing operations somewhat.

This year's findings are in close agreement with the results of 1949 when the Oregon reported that no concentrations of albacore could be found in Alaskan waters. Water movements and temperatures undoubtedly have an important influence on the migrations of tuna, and it may be possible that an unusual occurrence of warm water off the Alaskan coast in certain years could produce conditions favorable to a commercial fishery for albacore in these waters; but such conditions were not found to exist in 1949 or 1950. In contrast to the good results of July, the tuna fishery was very poor off the Oregon and Washington coasts during most of August and September, and the John N. Cobb found no albacore north of Cape Blanco during the last two weeks of September.

RESULTS OF GEAR TESTS

Standard commercial surface-trolled jigs were used as the principal means of locating and taking albacore. Long-line gear and gill nets were also fished whenever conditions were favorable. Very meager results were obtained with the long-line, only one albacore being taken in the few sets made with this gear. On the other hand, considerable success was experienced with the gill nets, up to 169 albacore being taken in one set. The nets proved valuable in locating albacore when the fish were not showing or biting and also served as a medium for determining vertical distribution of the schools.

Both nylon and linen gill nets were used with mesh sizes (stretched measure) of $7\frac{1}{2}$, $8\frac{1}{2}$, and $9\frac{1}{2}$ inches. Six 50-fathom shackles, one of each size of linen and nylon



FIGURE 3 - A GOOD CATCH OF ALBACORE TUNA IS REMOVED FROM THE GILL NETS.

nets, were drifted in a string free from the vessel; all fish were caught at night, with two daylight sets producing no tuna. On August 19, over a ton of albacore was taken in a set of the nets off the Queen Charlotte Islands. All sizes of mesh caught fish, weighing in the range of 11 to 35 pounds. Indications are that the $8\frac{1}{2}$ -inch mesh is probably the most efficient size for albacore tuna of this region, which average about 14 pounds.

On several occasions the nets caught fish when none could be taken with trolling gear before or after the set and there were

no signs of tuna in the vicinity. Depth of the nets was 100 meshes, and they were drifted with the cork line on the surface. The majority of the fish were taken in the top half of the net, very few near the lead line. From this observation it may be that a net 50 meshes deep will be practically as effective as the 100-mesh net, but further tests will be required to establish this point. Considerable economy in gear could be expected through use of 50-mesh nets if proven satisfactory. Preliminary examination of fishing records reveal very little difference in the fishing ability of the nylon and linen nets. Numerous blue shark, pomfret, and



FIGURE 4 - A LARGE ALBACORE TUNA IS HAULED ABOARD ENMESHED IN THE NYLON GILL NET FISHED BY THE JOHN N. COBB.

mackerel scad were caught in the nets along with the tuna, the shark quite often inflicting damage to the web and occasionally eating a tuna enmeshed in the net. Some damage to the albacore occurred when the nets were hauled in choppy seas, due to the meshes cutting into the flesh. Canning tests are being conducted by the Service's Technological Laboratory at Seattle to determine the suitability of the gill net-caught albacore for canning purposes.

OCEANOGRAPHIC AND BIOLOGICAL OBSERVATIONS

Very close attention was paid to water temperatures during the entire cruise, especially in relation to the abundance of albacore. Surface temperature readings were taken at hourly intervals, and several bathythermograph casts were made daily to determine vertical distribution of the warm water. There were approximately 100 water samples taken and a number of plankton tows made in an effort to correlate abundance of tuna with the chemical and organic constituents of the water. Ordinarily, the best fishing was found in blue water from 58° to 61° F., but occasionally scattered tuna were taken in green water, and, on two occasions, at temperatures as low as 54° to 55° F. Stomach analyses suggest that at times the fish will leave the warm blue water and enter colder green water in search of food.

Length and weight measurements were made on all fish taken, with a weight range of 8 to 35 pounds recorded. Data on albacore feeding habits were obtained by means of stomach samples taken immediately after the fish were landed on deck. Small rockfish constituted the bulk of the diet, 167 being taken from the stomach of one albacore. Squid, saury, small blackcod, and lantern fish were also present in varying amounts.

Over 400 albacore were tagged in an attempt to learn something of the migration pattern of the fish. Plastic disc tags held by nickel pins were attached at the base of the second dorsal fin on half of the fish and on the caudal keel of the remainder. No recoveries have been reported to date; however, three fishing vessels have reported catching tuna bearing tag marks, which is considered as evidence that at least some of the fish are surviving even though the tags may be torn loose in the water. Tagged albacore were kept alive up to 18 hours in the bait tanks of the vessel.



FIGURE 5 - NUMEROUS BLUE SHARK WERE TAKEN IN THE GILL NETS ALONG WITH THE ALBACORE TUNA.

NEW SEAMOUNT DISCOVERED

While engaged in investigating a report of large schools of tuna off the Columbia River on August 1, the John N. Cobb discovered a previously uncharted seamount at a position 46°44' N. latitude, 130°47' W. longitude, approximately 270 miles west of Willapa Bay, Washington. Recording fathometer traces¹ revealed a peak several miles in extent with depths as shallow as 20 fathoms and surrounding water 1600 fathoms deep. Long-line gear set at 70 fathoms yielded a good catch of large red rockfish (*Sebastes ruberrimus*), averaging 15 pounds each. While passing over the seamount again on September 15 and 16, seven sets of long-line gear were again fished at depths from 40 to 110 fathoms. There were three species of rockfish taken this time, plus 4 halibut weighing up to 43 pounds each. Bottom samples and depth recorder traces indicate the bottom to be quite rough and hard with some fairly flat ledges. Further exploration will be necessary in order to determine if the grounds can be successfully trawled.

¹/SEE COMMERCIAL FISHERIES REVIEW, NOVEMBER 1950, P. 42.

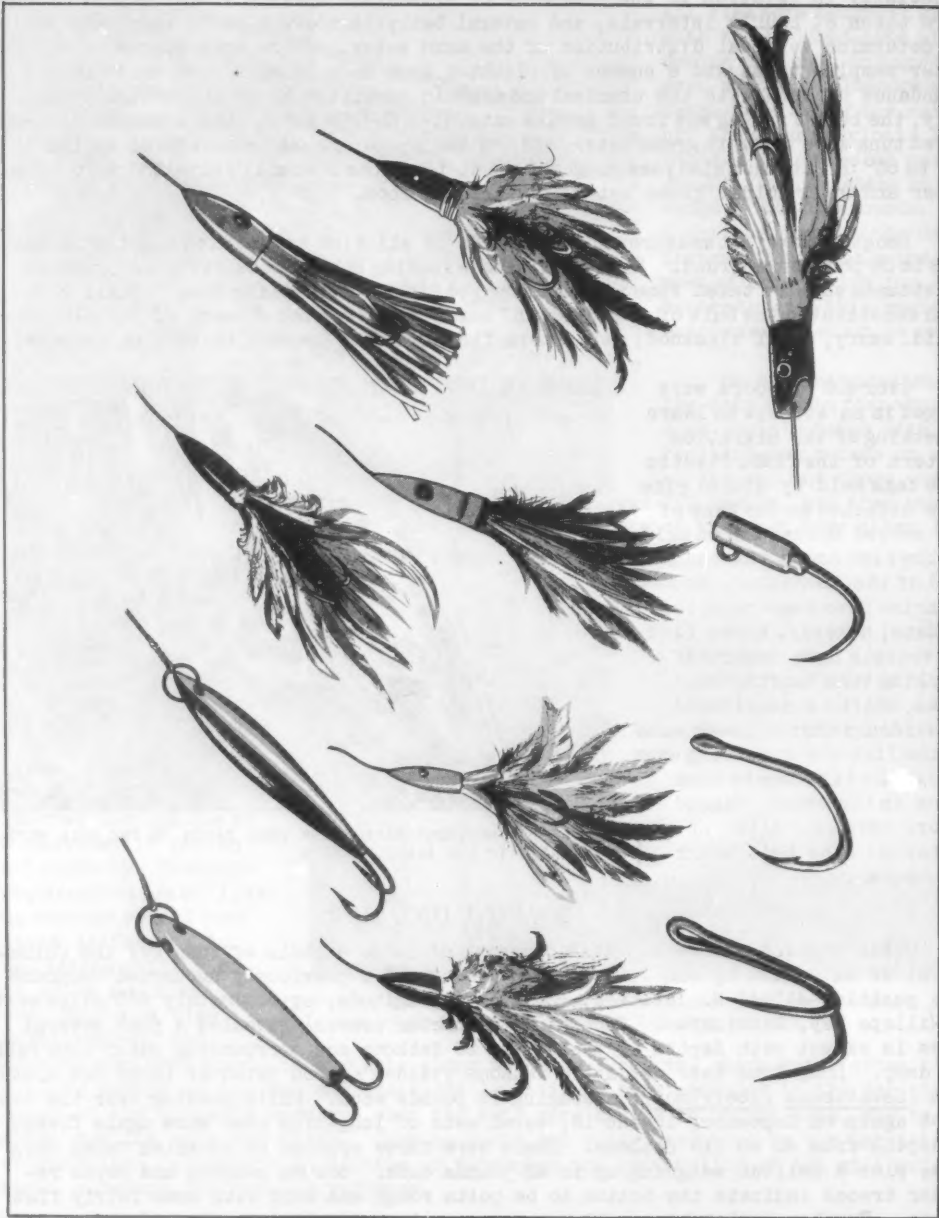


FIGURE 6 - MOST OF THE ALBACORE TUNA TAKEN BY THE JOHN N. COBB WERE CAUGHT ON SURFACE-TROLLED JIGS OF VARIOUS SIZES AND COLORS. SOME OF THOSE SHOWN WERE USED.

CONCLUSION

Very little is known concerning the origin and migration pattern of the albacore tuna which enter the fishery off the Oregon and Washington coasts in early summer. The John N. Cobb found albacore 500 miles off Cape Blanco on June 18, and subsequent catches indicate the movement of the fish was shoreward and then north along the coast in early July. Warm water (58° to 61° F.) and abundance of feed (mostly small rockfish) were found to be very important factors in determining the location and movements of the tuna. Although a few scattered albacore were caught north of Dixon Entrance, water temperatures were generally low off the Alaskan coast and no evidence of commercial quantities of the fish were found north of the Queen Charlotte Islands.



FIGURE 7 - RED ROCKFISH (SEBASTODES RUBERRIMUS) WERE CAUGHT BY THE JOHN N. COBB ON THE SEAMOUNT WITH LONG-LINE GEAR SET AT 70 FATHOMS.

Both linen and nylon gill nets were used successfully in catching albacore on many occasions. Over a ton was taken in a single set with 300 fathoms of this gear, and gill nets proved of value as exploratory gear as well as a method of determining vertical distribution of the fish. Canning tests now under way to determine suitability of gill net-caught tuna for canning purposes will have an important bearing on the future use of gill nets in the albacore fishery.

Note: A FINAL AND MORE DETAILED REPORT ON THE 1950 NORTH PACIFIC ALBACORE TUNA EXPLORATIONS BY THE JOHN N. COBB WILL BE ISSUED IN THE NEAR FUTURE.

* * * * *

LITERATURE CITED

- POWELL, DONALD E., AND HILDEBRAND, HENRY H.
1950. ALBACORE TUNA EXPLORATION IN ALASKA AND ADJACENT WATERS--1949.
U.S. FISH AND WILDLIFE SERVICE FISHERY LEAFLET 376.



FEEDING VALUE OF FISH MEALS

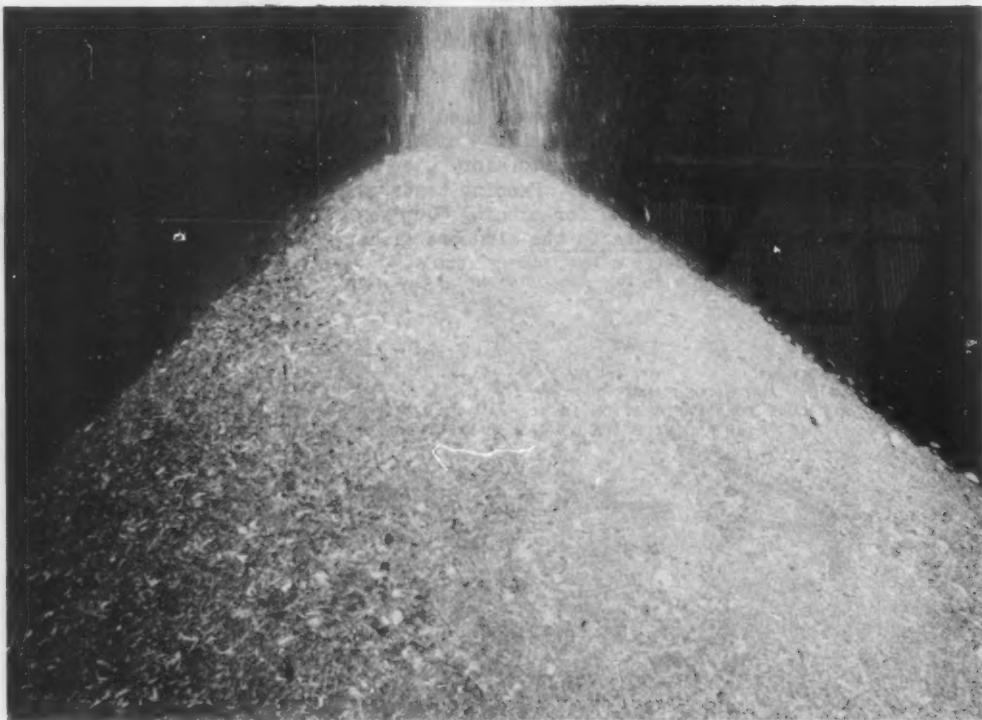
By Hugo W. Nilson*

INTRODUCTION

The feeding of poultry and swine is getting more complicated every day. This is because more and more animals are being kept in houses or on dry-lot or limited pasture all of the time; and also, gains in weight or production are expected to be both greater and cheaper.

The rations fed must contain all of the nutrients needed for rapid growth or high production in as inexpensive a combination as safety permits. The bulk of any ration is necessarily cereal grains. The concentrates used to supplement the cereal grains must be selected with care in order to obtain a balanced mixture.

These concentrates, which include fish meals, are used because they supply extra protein, certain vitamins, and some nutritionally essential minerals. Since it is not possible in this article to compare one concentrate with another (as to the nutrients each contains and the probable comparative values in respect to cost), this discussion will be limited to fish meals.



DRIED FISH SCRAP PRIOR TO GRINDING IN A CHESAPEAKE BAY MENHADEN REDUCTION PLANT.

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KINDS OF FISH MEALS

Fish meals in the United States are of two kinds: (1) Those produced from whole fish, and (2) those prepared from scrap obtained in filleting, canning, or other fishery processing operations.

The whole-fish meals are usually made from menhaden on the East Coast, pilchards (sardines) on the West Coast, and herring in Alaska. The whole fish are usually cooked with steam and pressed in order to separate out the mixture of water and oil. The oil and so-called "stickwater" are separated by centrifugation. The oil is used as a carrier for vitamins (feeding oils) or for industrial purposes. Much of the stickwater is now concentrated to 50-percent solids and sold as condensed fish solubles. The pressed fish scrap is dried, ground, and sacked, and in this form is one type of fish meal that is used for feeding animals.

The scrap from filleting or other fishery processing operations may be handled in the same way as the whole fish if the oil content is sufficient to pay for separation. If not, the scrap is usually dried, ground, and sacked. Meal when made from groundfish fillet scrap is commonly called white-fish meal.

Sometimes, of course, mixed meals are made from any raw material on hand. This is particularly true when whole so-called trash fish (species of fish which have limited or no sale as food fish) are mixed with production or processing scrap.

PROXIMATE CHEMICAL COMPOSITION

The proximate chemical composition gives some idea of the feeding value of fish meals. The principal nutrient is crude protein (nitrogen x 6.25). This amounts to 55 to 70 percent by weight. The scrap meals usually contain the least and the herring meal the most protein. The bulk of the meals contain 60 to 65 percent protein by weight.

The price of fish meal is usually based on protein content. Most meals are sold to the wholesale trade at a quoted price per protein unit. The protein unit is the percent of protein on a ton basis. A quotation, for instance, of \$2.50 per protein unit for a 60-percent protein meal, means that the price is \$150 a ton f.o.b. at the loading station listed in the quotation.

Although the protein content usually determines the price of the meal, this does not mean that protein is the only nutrient. Fish meals also contain about 8 percent of crude fat and 4 percent of nitrogen-free extract. These two nutrients supply calories, which although useful, can be supplied as well by cereals. They contain less than 1 percent of crude fiber. Fish meals, therefore, can also be classified as desirable low-fiber feeds for inclusion in the "high-energy" rations used for feeding rapidly-growing poultry and swine.

The mineral content of fish meals varies from about 12 percent for high-protein meal to about 33 percent for low-protein meal (about 55 percent). Most of the mineral content can be used by the animals. The nutritionally essential minerals supplied by fish meals are calcium, phosphorus, iron, copper, and some trace elements. Few studies have been made to find out the exact composition of the mineral matter, but since most of it comes from the bones of the fish, there should be no reason why the inorganic elements should not be well utilized by the animal.

The proximate chemical composition shows that the principal nutrients in fish meals are protein and minerals. Fish meals also have a desirable low-fiber content.

PROTEIN OF FISH MEALS

Biochemical studies further show that the protein in fish meals is of exceptionally good quality. Chemists have shown that a protein is made up of about 20 different amino acids. Ten of these are necessary in order for the animal to use protein efficiently, and these must be supplied by the feed at each feeding in certain minimum quantities since the animal cannot manufacture them. These are the so-called essential or indispensable amino acids. Some of the other 10 or more amino acids are very necessary too, but the animal can make them in the quantity needed if enough protein is fed.

There is no exact information on the kind and quantity of amino acids needed by poultry and swine. Based on feeding tests with rats, the following amino acids are considered essential, and three typical analyses are given for fish meals:

Amino acid	% by weight of protein*			Amino acid	% by weight of protein*		
	A	B	C		A	B	C
Tryptophane ..	0.9	1.2	1.3	Leucine	9.4	10.0	7.1
Lysine	8.0	5.7	7.8	Isoleucine	6.7	4.0	6.0
Methionine ...	2.8	3.0	3.5	Valine	5.9	4.0	5.8
Threonine	5.1	5.0	4.5	Histidine	2.4	2.4	2.4
Phenylalanine.	4.4	4.8	4.5	Arginine	7.9	5.9	7.4

*Grams of amino acid per 16 grams of nitrogen.

- A. Deas, Ney and Tarr 1950
- B. Block and Bolling 1945
- C. Block and Mitchell 1946

These analyses indicate that fish meals contain all of the essential amino acids in amounts which should permit rapid growth, maximum production, and efficient utilization of feed if the other nutrients are available in sufficient amounts.

The so-called dispensable amino acids are glycine, alanine, cystine, serine, tyrosine, norleucine, aspartic acid, glutamic acid, hydroxyglutamic acid, proline, and hydroxyproline. Recent feeding experiments have shown that it is necessary to have an adequate supply of this last group of amino acids at each feeding, as well as the so-called essential ones, in order to get efficient utilization of feed protein.

Only a few scattered analyses are available which give the amounts of the dispensable amino acids in fish meals, but these indicate that fish meals compare favorably with other animal protein byproducts in this respect.

On the basis of biochemical analyses and extensive feeding tests it can be concluded that fish meals are an excellent source of animal protein, containing all of the amino acids in sufficient amounts to permit rapid growth, maximum production, and efficient use of the feeds when fed at a level of at least three percent in most rations. The protein of fish meals is an excellent balancer for the protein of cereal grains and cereal byproducts.

VITAMIN CONTENT

A few years ago it was adequately demonstrated that if poultry or swine were fed a ration consisting essentially of plant materials (such as corn meal and soybean meal), together with vitamin or mineral supplements, maximum rate of growth could not be obtained without the use of some animal protein in the ration. It was

found that milk, meat products and, in particular, fish meal contained something that was not protein in nature but was essential for growth of the animals. Following the isolation of vitamin B₁₂ from liver extract and the demonstration of the value of this vitamin in the treatment of pernicious anemia, it was shown that vitamin B₁₂ would produce essentially the same effect as the substance present in animal-protein supplements that had been named the animal protein factor (APF). There is some evidence indicating that fish meals contain other factors in addition to vitamin B₁₂.

Fish meals contain from one-tenth to one-third of a milligram of vitamin B₁₂ per pound. A ton of poultry feed should contain at least 12 milligrams and a ton of swine feed at least 20 milligrams of vitamin B₁₂. It has been found that 60 to 100 pounds of fish meal per ton of poultry or swine feeds will supply enough vitamin B₁₂ and the unidentified factors for satisfactory growth. More than this quantity can oftentimes be used to good advantage to increase production and secure the best utilization of rations.

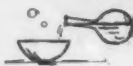
In addition to vitamin B₁₂ and the unidentified growth factors, fish meals contain about 3 milligrams of riboflavin, 30 milligrams of niacin, 3 milligrams of pantothenic acid, and 1,500 milligrams of choline per pound. These vitamins, too, are concerned with promoting growth and production, and the efficient utilization of feed.

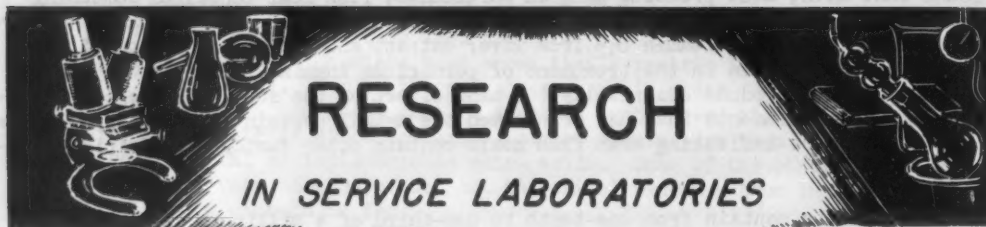
SUMMARY

Fish meals are an excellent source of high-quality animal protein, certain necessary vitamins including vitamin B₁₂ and other growth factors, and nutritionally essential minerals (particularly calcium, phosphorus, iron and copper). The high protein content (from 55 to 70 percent) and low-fiber content make fish meals a particularly good ingredient for "high-energy" rations for rapidly-growing poultry and swine.

Fish meals may also be included in all rations for breeding animals to advantage since they efficiently balance the low-cost cereal or cereal byproducts which make up the bulk of these rations.

Since fish meals are an excellent source of high-quality animal protein, certain essential vitamins, and nutritionally necessary minerals, they assist materially in the compounding of feeds to secure rapid growth, greater production, and the economical use of rations. In other words, the various fish meals are superior feed ingredients.





November 1950

REFRIGERATION: For an evaluation of the keeping quality of Alaska shrimp-- (1) raw, (2) cooked, and (3) treated with ascorbic acid--sample frozen packs were prepared aboard the Service's exploratory fishery vessel John N. Cobb during its shrimp exploratory work in Tenakee Inlet during November. (Ketchikan)

* * *

Comparative tests were made on the various species of Pacific Coast rockfish held in cold storage with the following over-all results: Sebastes marinus (Atlantic coast rosefish) had the best salability, with no significant decrease due to storage changes. The Pacific coast Sebastes alutus (long-jawed rockfish) was very slightly inferior to the S. marinus species but with practically no decreasing quality due to discoloration or to storage changes. S. ruberrimus (red snapper), S. paucispinis (bocaccio), and "idiot" rockfish (scientific name unknown) were all slightly inferior to the S. alutus with some indication of rancidity and discoloration being present. In the next classification came S. diploproa (lobe-jawed rockfish) and "chilipepper" (S. goodei?) which showed slight but definite indications of rancidity and discoloration. S. pinniger (orange rockfish) and S. miniatus (vermillion rockfish) were definitely rancid and had become considerably discolored due to oxidative storage changes.

S. pinniger is one of the common species marketed as rockfish by the Pacific Coast fillet industry. In the initial tests there was not a great deal of difference between this species and the S. alutus samples examined. In the test described above, however, there was an enormous difference between these species due to development of very adverse storage changes by the S. pinniger rockfish. It would appear from the results of this test that the factor of storage alone would make S. alutus far superior to other common species of rockfish now being marketed in the Pacific Northwest. (Seattle)

* * *

BYPRODUCTS: About 170 samples of fish meal, stickwater, and other intermediate products during the processing of fish meal were recently collected in California. In three different fish meal plants, extensive samples were obtained of the product at different stages of manufacture. Also, numerous samples were obtained in a large number of other plants using various types of drying and processing equipment. Although samples of several meals from various species (including anchovy, mackerel, tuna, and sardine) were obtained, most of the samples collected were produced from sardines (pilchards). One series of sardine meal samples were obtained from a large testing laboratory. These samples had been core sampled to be representative of large shipments of sardine meal so that each sample obtained was a composite sample

obtained from at least 100 bags of fish meal and was supposed to be representative of a 500-bag shipment. These included samples prepared from the start of the sardine season to the present time.

All of these samples (including the meal samples) were frozen and are now in cold storage at the Seattle laboratory. It is planned to analyze these samples for riboflavin and vitamin B₁₂, but active work on this project will not get underway until some time after January 1 when the hatchery food sample analyses have all been completed. (Seattle)

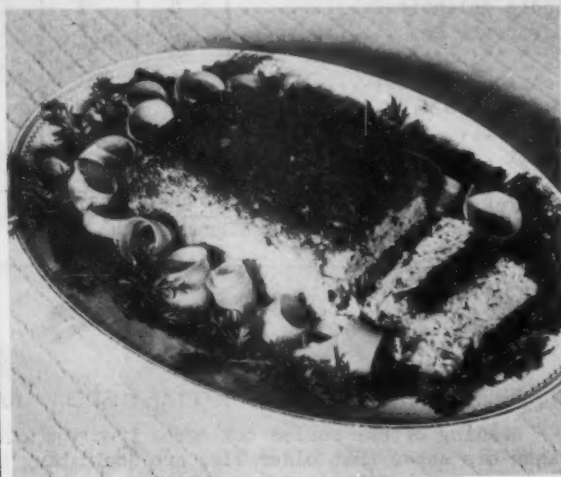
* * *

CANNING: The three different lots of tuna (namely, troll-caught frozen tuna, gill net-caught frozen tuna, and gill net-caught, iced and frozen tuna) were canned at a commercial cannery in Astoria using commercial type equipment. The condition of the fish was carefully noted at the time of canning. No difference could be observed in the condition of the raw fish. After precooking, there was no difference between the gill-net- and troll-caught fish, which had been frozen immediately upon catching. Most of the iced gill net-caught fish, likewise, were of equivalent quality to the other samples, but a few showed a very slight indication of honeycombing. A few cans of the canned product from each lot were cut and a preliminary examination made, but no difference in quality could be observed among any of the three lots. The canned fish are now being held for a period of several months before extensive examinations are made by a number of different laboratories. (Seattle)

FISH LOAF

- 4 cups canned flaked fish
- 3 cups soft bread crumbs
- $\frac{3}{4}$ cups milk
- 2 eggs, well beaten
- $1\frac{1}{2}$ tablespoons minced parsley
- 1 tablespoon lemon juice
- $1\frac{1}{2}$ teaspoons salt
- 3 tablespoons butter or fortified margarine
- 2 tablespoons onion, grated
- $\frac{1}{2}$ teaspoon celery salt
- Few grains of cayenne

Combine all ingredients, mixing well. Place in a greased loaf pan. Bake in a moderate oven 350° F. for 40 to 45 minutes or until loaf is firm in the center. Unmold on a hot platter, and serve with a rich, bright-colored sauce. Serves 6.





TRENDS AND DEVELOPMENTS

Additions to the Fleet of U. S. Fishing Vessels

First documents as fishing craft were received by 69 vessels of 5 net tons and over during September 1950—8 less than in September 1949. Louisiana and Florida led with 11 vessels each, followed by California and Texas with 8 vessels each.

A total of 671 vessels were documented during the first 9 months of 1950, compared with 804 during the same period in 1949.

Of the vessels receiving their first documents as fishing craft during September, 48 were built during 1949 and 1950, and the remainder prior to 1948.

Vessels Obtaining Their First Documents as Fishing Craft, September 1950					
Section	September		Nine mos. ending with Sept.		Total
	1950	1949	1950	1949	1949
	Number	Number	Number	Number	Number
New England	6	2	28	27	35
Middle Atlantic	3	1	39	39	44
Chesapeake Bay	3	6	63	55	87
South Atlantic and Gulf	38	30	252	273	369
Pacific Coast	13	31	200	293	327
Great Lakes	1	2	10	33	38
Alaska	5	5	76	80	96
Hawaii	-	-	3	3	5
Unknown	-	-	-	1	1
Total	69	77	671	804	1,002

Note: Vessels have been assigned to the various sections on the basis of their home port.

Alaska Herring Fishery Outlook Gloomy

Reading of the scales collected from the Alaska herring fishery during the 1950 season has shown that older fish are dominating the catch in both Prince William Sound and Southeastern areas, according to biologists of the U. S. Fish and Wildlife Service. In both areas, the six-year-old class was most abundant with the 2-, 3-, and 4-year olds contributing much lesser amounts. In the Southern area, 2-year fish were almost completely absent. This scarcity of young fish in both areas points to a rather gloomy outlook for the Alaska herring catch in the next couple of years.

Alaska Fisheries--1949^{1/}

Of all the industries in the Territory of Alaska, the fishing industry has been developed to the greatest extent. The total value of the 1949 fisheries production in the Territory amounted to \$107 million, according to the annual report of the United States to FAO. Salmon canning constitutes the principal activity in the fishing industry and almost 4,500,000 cases, valued at \$94 million, were packed during 1949. Mild-cured, fresh, and frozen salmon production amounted to 15,000,000 pounds, worth \$3,750,000. Almost 23,000,000 pounds of halibut, valued at \$5,500,000, was landed at Alaska ports during the past year. Herring production of 30,000,000 pounds was worth \$950 thousand. All others, including clams, crabs, shrimp, meal, oil, etc., had a total value of \$2,500,000. Considerable opportunity exists for further expansion of the industry in the byproducts field and utilization of species not now being fished.



SALMON PURSE SEINER DOCKED AT KODIAK, ALASKA. PURSE SEINE NET IS STORED IN THE STERN OF THE BOAT. FISHING FLEET DOCKS CAN BE SEEN IN THE BACKGROUND.

^{1/}ABSTRACTED FROM ANNUAL REPORT OF THE GOVERNMENT OF THE UNITED STATES OF AMERICA TO THE FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (SEPTEMBER 1950).



Army Quartermaster Specifications to be Available From Three Sources

As an added service to manufacturers, processors, and venders wishing to bid on Army Quartermaster Corps supplies, copies of specifications covering Quartermaster items will be available to prospective bidders after November 1 from any of three Quartermaster procurement agencies, the Department of the Army announced on October 27, 1950.

Specifications have been available only from the agency calling for bids on a particular article. The increased number of prospective bidders from all parts of the country has necessitated a broader service in supplying specifications.

Regardless of which procurement agency issues the invitation hereafter, prospective bidders may request and receive specifications (including those for fishery products) from any of the agencies. This is expected to speed procurement procedures and facilitate preparation of bids.

Quartermaster procurement agencies which will supply specifications upon request are: Quartermaster Procurement Agency, 111 East 16th Street, New York 3, New York; Chicago Quartermaster Depot, 1819 West Pershing Road, Chicago 9, Illinois; and Oakland Quartermaster Procurement Agency, Oakland Army Base, Oakland 3, California.



Federal Purchases of Fishery Products

DEPARTMENT OF THE ARMY, September 1950: A total of 1,171,779 pounds (valued at \$485,069) of fresh and frozen fishery products were purchased during September this year by the Army Quartermaster Corps for the U. S. Army, Navy, Marine Corps, and Air Force for military feeding (see table). September purchases declined 60.2 percent in quantity and 59.3 percent in value as compared with the previous month; and were down 37.4 percent in quantity and 24.1 percent in value as compared with September 1949.

Purchases of Fresh and Frozen Fishery Products by Department of the Army (September and the First Nine Months, 1950 and 1949)							
Q U A N T I T Y				V A L U E			
September		January-September		September		January-September	
1950	1949	1950	1949	1950	1949	1950	1949
lbs.	lbs.	lbs.	lbs.	\$	\$	\$	\$
1,171,779	1,872,844	11,810,436	12,962,832	485,069	639,460	4,897,322	4,276,365

Purchases for the first nine months this year were 8.9 percent lower in quantity, but 14.5 percent higher in value than for the corresponding period in 1949.



Gulf Exploratory Fishery Program

"OREGON" TO LOCATE GROOVED SHRIMP AND TEST SHRIMP TRAWLS: Location of new grooved-shrimp grounds and the testing of shrimp trawls and shrimp and fish traps are the primary objectives of the Oregon's Cruise No. 5. The Service's Gulf Exploratory Fishery Program vessel left Pascagoula on November 14 and is scheduled to return on December 20. It will operate off the Gulf Coast between Aransas Pass, Texas, and Cameron, Louisiana, chiefly in depths greater than 20 fathoms.

Objectives of Cruise: The primary objective will be to locate commercial concentrations of grooved (brown) shrimp and to record conditions under which concentrations are found to exist, for comparison with similar data from other areas. A series of 75 trawling stations are planned for work in depths from 10 to 250 fathoms, but the largest proportion of these will probably center around the 30- to 50-fathom range.

A secondary objective on this cruise will be to test under various conditions the comparative efficiency of three types of shrimp trawls now commonly used in the Gulf of Mexico.

Another related activity planned for this cruise will be the testing of several types of shrimp and fish traps, particularly in areas where the bottom is not suited to trawling. It is not expected that catches of shrimp from traps will be large enough to be of commercial value. This use of traps by the Oregon is essentially an attempt to get information that may fill in gaps in the knowledge of the movements of some of the commercially-important species from one good fishing spot to another.

Operations During November 1950: The Oregon headed west after making a few drags off the mouth of the Mississippi River for comparison with September and July results. Indications of substantial numbers (150 pounds per hour) of 8-count grooved shrimp were found about 75 miles southeast of Freeport, Texas, during the vessel's operations in November. Work to delineate the present range of this population of shrimp is being continued.



Hawaiian Fisheries--1949-1/

Hawaiian fisheries production has continued its upward postwar trend. The catch landed in the calendar year 1949 was greater than in 1948, according to the annual report of the United States to FAO. This was due entirely to the continued increase in the tuna taken for canning purposes. The 1949 tuna catch was 18 percent larger than in 1948, and 75 percent larger than in 1946. The catch taken for consumption as fresh fish remains more or less static, although it was slightly less in 1949 than the previous year. The total of all fish landed during the calendar year 1949 was 8,057 tons. Of this, 4,922 tons was tuna used for canning purposes and 3,135 tons for sale as fresh fish to the local population. A portion of the canned tuna was exported.

The Pacific Ocean Fisheries Exploratory Research program under the Fish and Wildlife Service of the U. S. Department of the Interior was fully underway by the end of the calendar year. Employment in the fisheries field will increase as new areas and methods are discovered for economically harvesting the first crop.

1/ ABSTRACTED FROM ANNUAL REPORT OF THE GOVERNMENT OF THE UNITED STATES OF AMERICA TO THE FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (SEPTEMBER 1950).

Michigan's Mussel-Shell Industry Fades Out in 1950

The business of dredging fresh-water mussels from Michigan's streams for pearl-shell buttons finally has skidded into oblivion, the Michigan Department of Conservation reported in November. This industry, prior to 1930, was worth \$500,000 annually.

More buttons are being made of plastics and ocean shells. Also, mussel dredgers have found little encouragement to keep the industry alive because of the availability of more stable employment opportunities.

The Conservation Department, which licensed only four dredgers to operate in 1949, reports that not even one license request was received in 1950. As recently as 1946, the Department issued 312 licenses; and in 1930 the State had 2,460 persons in the business.

The mussel season was closed by the Commission during 1944 and 1945 due to a shell scarcity. When open, the season normally runs from July 1 to September 30.



Missouri's Commercial Fisheries Production, 1949

Commercial fishing in the State of Missouri is permitted in the Mississippi and Missouri rivers, and that part of the St. Francis River which forms the boundary between Arkansas and Missouri, the Missouri Conservation Commission reported in September 1950. In 1949, commercial fishing permits were purchased by 1,407 Missouri residents—277 below the 1948 total. About 544 permit holders fished in the Mississippi River, 802 in the Missouri River, and 61 in the St. Francis River.

According to monthly reports, a total of 846,102 pounds of fish was taken by commercial fishermen in these waters—12 percent less than that reported in 1948. In 1949, a catch of 549,199 pounds of fish was reported for the Missouri River; 354,960 pounds for the Mississippi; and 31,943 pounds for the St. Francis.

Carp composed 43.8 percent of the Mississippi River catch, 64.2 percent of the Missouri River production, and 50.5 percent of the St. Francis River take. Buffalo-fish ranked second, while flathead catfish (mud catfish) ranked third in the Missouri and St. Francis, and fourth in the Mississippi. Drum (fresh-water sheepshead) ranked third in the Mississippi and fourth for the Missouri and St. Francis.



North Pacific Exploratory Fishery Program

"JOHN N. COBB" EXPLORES FOR SHRIMP AND CRABS IN SOUTHEASTERN ALASKA (November 1950): Using beam trawls, otter trawls, and a New Bedford-type scallop dredge, the Service's exploratory fishing vessel John N. Cobb during November explored the possibilities of an "off-season" fishery for shrimp, crabs, scallops, and other bottom fish. Shrimp and crab traps are also being used on grounds where trawls are not practical.

The vessel, on Cruise No. 5, stopped at Ketchikan, Alaska, en route to the fishing grounds and picked up technologists from the Fishery Products Laboratory in that city, who are conducting studies on shrimp processing and packaging aboard the vessel.

Fishing in Tenakee Inlet and parts of Chatham Straits resulted in poor catches of shrimp. Although shrimp seemed widely distributed throughout the area, they were not found in commercial concentrations. Scallop fishing trials gave the same results.

In Peril Straits, large "spot" shrimp were taken by traps in rocky bottom in depths of 60 to 75 fathoms. Possibilities may exist for a small-scale commercial fishery for this variety. However, the vessel reported good catches of pink shrimp, exceeding 200 pounds per hour's fishing in the region near Sitka. Work in this area will be continued in order to obtain more information as to the extent of this shrimp population.



Pacific Oceanic Fishery Investigations

PURSE-SEINE TUNA EXPLORATIONS TO BE CONTINUED BY "JOHN R. MANNING" (Cruise No. IV): Experimental purse-seine tuna-fishing operations will be continued by the John R. Manning on Cruise No. IV. The vessel, one of three research vessels of the Service's Pacific Oceanic Fishery Investigations, left Honolulu on October 26 and is expected to complete the cruise on December 7, 1950. The waters adjacent to the Line Islands from Kingman Reef to Christmas Island will be explored by the vessel.

In order to achieve the primary purpose of the cruise, a standard West Coast purse seine will be employed to ascertain its effectiveness for catching tuna in the central Pacific Ocean, and to determine what modifications may be needed in the standard gear to take advantage of differences in behavior of the tunas in this region from those off the American west coast.

Secondary objectives will be experimental fishing by live bait, together with obtaining hydrographic and synoptic weather observations, and the collection of biological materials.



Puerto Rican Fisheries ^{1/}

Environmental conditions limit the intensity of fishery operations in Puerto Rico. Improvements for the preservation of the fishery products are being made and freezing units are being installed in groceries and markets, according to the annual report of the United States to FAO.

The production of fish in 1945 was estimated at 3,276,000 pounds (valued at \$458,640 to the fishermen). The estimated fresh fish production for 1947-48 has averaged 4,000,000 pounds, with an estimated total value of \$600,000. This does not include live spiny lobsters which had a value of approximately \$32,000.

^{1/} ABSTRACTED FROM ANNUAL REPORT OF THE GOVERNMENT OF THE UNITED STATES OF AMERICA TO THE FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (SEPTEMBER 1950).

Limited refrigeration facilities in distribution channels have greatly hindered the growth of the fresh fish trade in Puerto Rico. Both dealers and consumers have suffered from the lack of this convenience. In recent years great progress has been made in providing better refrigeration facilities; freezing plants have been established in San Juan, Ponce, Mayaguez, and Fajardo. Two freezing plants are owned and operated by the Government of Puerto Rico—one in San Juan and another in Fajardo.

The distribution of fresh fishery products in Puerto Rico is carried on by wholesalers, retailers, and peddlers and restricted generally to coastal areas. Very little fresh fish finds its way to the inland areas.

There are only a few wholesale dealers in Puerto Rico and their purchases of fresh fish are made directly from the primary producer. In some cases, wholesalers have entered the production end of the business in order to assure a constant supply. Wholesalers in the industry are reported to produce about 55 percent of the volume handled, and obtain the balance by purchasing from primary producers. The entrance of the wholesaler in the field of production has helped to improve handling methods.

The retail trade in fresh fishery products is handled by a few market stalls in the San Juan, Ponce, and Mayaguez areas. In addition, other combination stores and grocery stores are engaged in the trade in a very small scale to comply with their customers' request for fresh fish. Only five specialized seafood stores in San Juan are engaged in the retailing of fish to restaurants, hotels, and grocery stores, and these constitute one of the main outlets in the wholesale business.

Peddling is one of the most common methods for marketing fresh fishery products in Puerto Rico. Peddling is most common in those coastal communities where the distribution of fish is not well organized due to the absence of refrigeration or transportation facilities for the quick disposal of the catch. Due to the perishability of the product, fishermen are forced to peddle a large part of the catch by either hiring peddlers on a commission basis or peddling themselves. It is estimated that no less than 25 percent of the total catch is being peddled at present.



Recommendations for the Regulation of Gulf of Mexico Shrimp Fisheries

A set of recommendations for the regulation of the shrimp fisheries of the Gulf of Mexico were presented at the Annual Meeting of the Gulf States Marine Fisheries Commission held on October 19-20, 1950, in New Orleans. These recommendations were developed by the Commission's Committee to Correlate Research and Exploratory Data, in cooperation with U. S. Fish and Wildlife Service representatives, and were submitted for consideration of the Commission; but no action was taken by the Commission at this meeting. The recommendations, as submitted, were as follows:

RECOMMENDATIONS FOR THE REGULATION OF THE SHRIMP FISHERY OF THE GULF OF MEXICO SUBMITTED BY THE SCIENTIFIC ADVISORY COMMITTEE OF THE GULF STATES MARINE FISHERIES COMMISSION

The recommendations that follow are based upon present knowledge of the shrimp and the shrimp fishery. Future developments may require revision of these recommendations. The purpose of the recommendations is to obtain the maximum poundage of shrimp from each year's crop without unduly hampering the industry.

We base these recommendations on the knowledge that it is not necessary to protect the spawning stock and we assume that it is advantageous to protect the small shrimp.

While most of our knowledge is based upon research on the common shrimp, *Penaeus setiferus*, we have no reason to believe at this time that suggested regulations will not apply equally well to the grooved shrimp, *Penaeus aztecus* and *Penaeus duorarum*.

The following facts concerning the life history of the common shrimp we consider to be fundamental for the framing of regulations of the fishery:

1. Spawning occurs approximately from March through September in the offshore waters. The eggs are laid directly into the water and are not carried by the female. A female shrimp will lay between 500,000 and 1,000,000 eggs at a spawning.

2. The eggs hatch within a few hours and the young shrimp are carried by currents to the bays and estuaries which are the nursery grounds.
3. On the nursery grounds during the summer the young shrimp grow very rapidly, generally more than doubling their weight each month.
4. As they increase in size they move to waters of higher salinity. In Louisiana, Mississippi, Alabama and the west coast of Florida the young appear in abundance on the inside fishing grounds by mid-June; in Texas by mid-July.
5. Shortly after appearing in abundance on the inside fishing grounds the larger shrimp begin to move to the outside waters. Thereafter there is a constant movement of these larger shrimp from the inside to the outside waters.
6. With the approach of winter and the resultant lowering of water temperature this movement is speeded up. The result is that the larger shrimp have moved to the outside waters leaving the smaller shrimp in the inside waters. At the same time the growth rate of the shrimp is appreciably decreased due to these lower temperatures.
7. With the approach of spring and the resultant warming of the waters the small shrimp which wintered over in the inside waters assume a very rapid rate of growth and soon catch up in size with the earlier spawned individuals. Concurrently they move from the inside to the outside waters. In these outside waters spawning takes place. At spawning these shrimp are approximately one year old. Few if any survive to spawn a second year. Therefore for all practical purposes the common shrimp is an annual.

We define inside waters to be all waters landward of the three-fathom line in the Gulf of Mexico. Outside waters are all waters seaward from the three-fathom line in the Gulf of Mexico.

Closed Seasons

Inside waters:

The first closed season for inside waters should be, for the area east of the Louisiana-Texas boundary, to and including St. Marks, Florida, from June 15 to August 31. The closed season for the inside waters of Texas should be from July 15 to September 15.

The second closed season for inside waters in all states should be from December 15 of one year to March 31 of the following year.

The first closed season is suggested to protect the small shrimp during the period of their most rapid growth. The different season suggested for Texas waters results from the fact pointed out above that the young shrimp appear later in the inside waters of this area.

The second closed season is suggested for the purpose of protecting the small shrimp that are wintering over in the inside waters. These shrimp produce the spring run.

Outside waters:

The outside waters should remain open to fishing in all states throughout the entire year.

There is at present no indication of a relationship between the number of spawners and the resulting crop. At no season of the year do small individuals predominate in the shrimp population in outside waters.

Size Limits

We recommend no size limits and that those now in effect be abolished.

When a size limit is imposed the basic purpose of the regulation is defeated by culling. Shrimp smaller than the legal size which have been killed in the fishing operation are discarded. The closed seasons recommended above if strictly enforced should provide adequate controls. While of no biological significance it is a fact that size limits are difficult to enforce which further detracts from their usefulness.

Night Fishing

Night fishing should be permitted in all waters during open seasons.

Whether a shrimp is caught during the day or during the night the effect on the population is the same.

A ban on night fishing would almost eliminate the grooved shrimp fishery which has become of great importance and has promise of considerable development.

Gear

No limitations are suggested on size of trawls or mesh.

We have no evidence that trawling is harmful or beneficial to the bottoms. The criticism that large trawls take an undue quantity of shrimp from the inside waters is not sound since it makes no difference to the shrimp population whether or not the shrimp are caught by a large or a small trawl. Competition between units of the fleet is an economic rather than a biological problem. Again we believe that the recommended closed seasons properly enforced should suffice for adequate control.

The size of mesh used in a trawl does not control to any marked degree the size of shrimp caught. In any case, we have already stated that the size of shrimp caught during open seasons does not need to be controlled.

The data we have shows that no significant quantities of important commercial or sport fishes are taken in shrimp trawling operations. In order to permit the escape of the small numbers of important fish which are caught it would be necessary to increase the size of the mesh to an extent which would seriously decrease the ability of the trawl to catch shrimp. The value of the shrimp caught by trawling operations is so vastly greater than the value of the fish incidentally caught that to curtail shrimping in order to prevent the capture of these fish would be unjustified.

Heading of Shrimp on the Grounds

There is no necessity for prohibiting the heading of shrimp on the fishing grounds.

Shrimp are cannibalistic, they will eat their fellows dead or alive. It is highly unlikely that the presence of shrimp heads on the bottom will cause live

shrimp to avoid that area. Returning shrimp heads to the sea is replacing a portion of nutrient removed.

Bait Fishing

It is suggested that the shrimp bait fishery regulations be seriously reconsidered since there is much evidence of the abuse of this privilege.



Texas Shrimp Fisheries--Trends and Conditions, 1950

The Texas shrimp fisheries continued to expand during 1950 according to a report from the Service's Fishery Marketing Specialist conducting the annual statistical fisheries survey of the Gulf States.

The brown shrimp fishery of Texas, which began in 1947, expanded greatly during this year. With the recent discovery of pink shrimp off the northern coast of Yucatan in the vicinity of the Campeche Snapper Banks, the fishery for brown and pink shrimp spread completely around the Gulf. One boat started fishing in the new area about mid-May, and by mid-August other vessels were operating in the same area. It is necessary for the vessels to hire additional men to "head" the shrimp aboard the vessels operating off Yucatan. The vessels usually return to port after fishing about three nights. The discovery of this new fishery has resulted in a concentration of the larger trawlers in the vicinity of Brownsville.

Elsewhere along the Texas coast the catches of shrimp have been fairly good. The run of white shrimp in the vicinity of Galveston, Freeport, and Sabine was better during May and June than in many years. More shrimp (mostly white) were landed at these ports in 1950 than at any time during the past five years. However, the fall run of white shrimp has been disappointing. When the bays were opened to shrimp fishing on September 1, 1950, the shrimp taken were mostly 21 to 30 count, an unusually large shrimp for the time of the year; however, the catches were poor.

With production at an all-time high during the summer months, the freezers were filled to capacity. By the time the fall season got well under way, most freezers could not handle any more shrimp and dealers were forced to market considerable quantities on the fresh market. This created a glut, consequently new ex-vessel prices were announced by the Texas Fishermen's Association effective August 25. The new ex-vessel prices were 2 cents per pound lower.

Even these lower prices did not move all the shrimp being produced, and on August 31 these prices were again reduced another two cents for all types and sizes to the following:

Size No. of heads-off shrimp per pound	Type of Shrimp	
	White	Grooved, Brown, and Pink
	(cents per pound)	
15-20	26	24
21-25	24	22
26-30	21	19
31-42	19	15

On July 9, the Texas, Game, Fish and Oyster Commission increased the number of shrimp licenses from 1,550 to 2,325.

U. S. Tuna Pack in 1950 Expected to Break All-Time Record

A record-breaking tuna pack of 9,000,000 standard cases for 1950 is in sight if production continues at the present rate. Even if production should decline during the next two months, the 1950 pack will probably exceed that of last year by a million cases, Fish and Wildlife Service statisticians assert. In 1949,^{1/} 7,290,000 standard cases of tuna were packed.

This will be the sixth successive year that a record has been established by the tuna industry. The average pack for the record-breaking years of 1944 to 1949 was 5,500,000 cases. During the war, tuna production dropped—reaching a low of 2,500,000 cases in 1942. While 1940 had a record pack of 4,188,000 cases, the 1935-39 average was less than 3,000,000 cases.

Increased tuna production in 1950 will only partially offset the loss in the production of canned salmon. The 1950 salmon pack, which was the smallest since 1921, was 75,000,000 pounds less than in the previous season, while the increase in tuna is estimated at about 25,000,000 pounds.

Imports of canned tuna will also provide additional supply with nearly five times as much tuna imported in 1950 as in 1949. Foreign producers are shipping their packs to the United States before the tariff of 22-1/2 percent ad valorem on tuna is increased to 45 percent on January 1.

^{1/} SEE COMMERCIAL FISHERIES REVIEW, JUNE 1950, PP. 28-9.

NOTE: CASES REPRESENT "STANDARD CASES" OF 48 NO. 1/2 TUNA CANS TO THE CASE, EACH CAN CONTAINING 7 OUNCES NET WEIGHT OF SOLID-PACKED MEAT OR 6 OUNCES NET WEIGHT OF FLAKES OR GRATED MEAT.



Wholesale and Retail Prices

WHOLESALE PRICES, OCTOBER 1950: Wholesale prices for fishery products during October this year were somewhat uneven, but were generally lower than in September. The edible fish and shellfish (fresh, frozen, and canned) wholesale index for October was 110.3 percent of the 1947 average (see table 1)—1.5 percent below the previous month, but still 12.8 percent above October 1949, according to the Bureau of Labor Statistics of the Department of Labor. Heavy production in all areas and substantial cold storage stocks probably accounted for the general decline.

Of the four subgroup indexes that make up the fishery products wholesale index, the canned fishery products subgroup index was the only one that increased in October. Higher prices quoted for canned salmon during October raised this subgroup index to 113.2 percent of the 1947 average—1.7 percent higher than the previous month and 19.8 percent above October a year ago. On the other hand, increased packing of canned tuna in California and the Pacific Northwest has resulted in a record pack to date and prices for this product showed signs of weakening. October canned tuna prices were slightly lower than a month ago and were lower than in October 1949. Prices of canned Maine sardines and California sardines during October remained steady in spite of larger packs, with the former selling at higher prices and the latter at lower prices than in the corresponding month a year ago.

All other subgroups in the fishery products wholesale index showed a general decline during October as compared with September this year. The biggest drop oc-

curred in the fresh processed fish and shellfish subgroup. In this subgroup, there was a decline of 6.0 percent from September to October, and this year's October index was 1.0 percent below the corresponding month the previous year. The biggest price decline occurred in shrimp—due to the unusually heavy production on the Gulf Coast, increased imports, and large cold storage holdings. Prices of small haddock fillets also declined because of the heavy production of scrod haddock in New England this year, and a scarcity of large haddock. Shucked oysters during October also were quoted at lower prices.

There was a general decline of 3.1 percent from September to October in the drawn, dressed, or whole finfish subgroup. However, this year's October prices for items under this subgroup were still 15.4 percent higher than in October 1949. All fresh-water fish prices listed in this subgroup dropped substantially as compared with the previous month. However, the higher prices which prevailed in September were due to the Hebraic holidays which occurred during that month. Although the halibut prices quoted during October were higher than in September, large cold storage stocks of halibut may weaken the market, but prices were still substantially higher than in October 1949. Fresh drawn haddock and dressed fresh or frozen salmon prices dropped slightly from September to October this year, but they were still substantially higher than those prevailing in October 1949.

Table 1 - Wholesale Average Prices and Indexes of Fish and Shellfish, October 1950, with Comparative Data									
GROUP, SUBGROUP, AND ITEM SPECIFICATION	POINT OF PRICING	UNIT	AVERAGE PRICES (\$)			INDEXES (1947 = 100)			
			Oct. 1950	Sept. 1950	Oct. 1949	Oct. 1950	Sept. 1950	Oct. 1949	
ALL FISH AND SHELLFISH (Fresh, Frozen, and Canned)									
Fresh and Frozen Fishery Products:									
Drawn, Dressed, or Whole Finfish:									
Haddock, large, offshore, drawn, fresh	Boston	lb.	.12	.13	.11	110.8	112.5	98.2	
Halibut, Western, 20/30 lbs., dressed,						109.1	113.3	100.6	
fresh or frozen	New York City	"	.40	.40	.38	128.2	129.2	108.6	
Salmon, king, lgs. & med., dressed,	" " "	"	.56	.56	.49	129.4	130.7	117.1	
fresh or frozen	" " "	"	.43	.47	.48	116.1	115.3	92.3	
Lake trout, domestic, mostly No. 1, drawn	Chicago	"	.45	.51	.48	136.8	139.0	117.6	
(dressed), fresh	"	"	.45	.51	.40	95.1	103.6	103.2	
Whitefish, mostly Lake Superior, drawn	"	"	.45	.51	.40	130.0	147.1	115.3	
(dressed), fresh	"	"	.45	.51	.40	130.0	147.1	115.3	
Whitefish, mostly Lake Erie pound net,	"	"	.45	.51	.40	130.0	147.1	115.3	
round, fresh	New York City	"	.53	.79	.44	120.5	179.4	99.9	
Yellow pike, mostly Michigan (Lakes	"	"	.53	.79	.44	120.5	179.4	99.9	
Michigan & Huron), round, fresh	" " "	"	.40	.56	.35	93.9	135.5	81.5	
Processed, Fresh (Fish and Shellfish):						89.3	95.0	90.2	
Fillet, haddock, small, skins on,	Boston	lb.	.87	.87	.83	95.4	97.7	118.4	
30-lb. tins	"	"	.87	.87	.83	95.4	97.7	118.4	
Shrimp, lgs. (25-30 count), headless,	New York City	"	.54	.59	.54	77.2	85.3	77.6	
fresh or frozen	New York City	"	.54	.59	.54	77.2	85.3	77.6	
Oysters, shucked, standards	Norfolk area	gal.	4.40	4.50	4.22	106.3	110.8	103.6	
Processed, Frozen (Fish and Shellfish):						102.6	103.5	99.0	
Fillet: Flounder (yellowtail), skinless,	Boston	lb.	.35	.35	.32	113.0	113.0	103.9	
10-lb. boxes	"	"	.35	.35	.32	113.0	113.0	103.9	
Haddock, small, 10-lb. cello-pack	"	"	.34	.28	.24	109.7	115.4	109.7	
Rosefish, 10-lb. cello-pack	Gloucester	"	.26	.24	.22	129.8	122.2	108.0	
Shrimp, lgs. (25-30 count), 5- to 10-lb. boxes	Chicago	"	.59	.61	.62	84.5	86.2	89.7	
Canned Fishery Products:						113.2	111.3	94.5	
Salmon, pink, No. 1 tall (16 oz.), 48 cans	Seattle	case	23.64	22.90	15.76	154.1	149.3	102.7	
per case	Los Angeles	"	14.75	14.81	15.25	96.0	96.4	99.2	
Tuna, light meat, solid pack, No. 3 tuna	"	"	6.25	6.25	5.85	89.9	89.9	85.4	
(7 oz.), 48 cans per case	"	"	6.25	6.25	5.85	89.9	89.9	85.4	
Sardines (pilchard), California, tomato	"	"	6.25	6.25	5.85	89.9	89.9	85.4	
pack, No. 1 oval (15 oz.), 48 cans per case	"	"	6.25	6.25	5.85	89.9	89.9	85.4	
Sardines, Maine, keyless oil, No. 2 drawn	"	"	6.25	6.25	5.85	89.9	89.9	85.4	
(3 1/2 oz.), 100 cans per case	New York City	"	5.75	5.75	7.70	56.4	56.4	75.5	

October prices for the frozen processed fish and shellfish subgroup were only 0.9 percent below September and 3.6 percent higher than in October a year earlier. The drop in this subgroup was due mainly to lower prices for frozen haddock fillets and frozen shrimp. In October this year, haddock fillets sold at the same level as in the corresponding month a year ago, but shrimp were quoted at prices which were lower. Among the items in this subgroup, the only increase during October occurred in the frozen rosefish fillet prices, which were substantially higher than the previous month and still higher than in October 1949. October prices for frozen flounder fillets remained steady, but they continued at a higher level than in the corresponding month a year ago.

RETAIL PRICES, OCTOBER 1950: In direct contrast to the decline which occurred in the wholesale prices of fishery products during October, prices of fish and shellfish at retail rose substantially mainly due to the big increase in the retail prices of canned pink salmon.

Between September 15 and October 15, 1950, retail food prices rose only 0.2 percent and on October 15 they were still 4.2 percent higher than on the same date a year earlier (table 2). Fish and shellfish (fresh, frozen, and canned) retail prices, on the other hand, rose 5.6 percent from September 15 to October 15 and on the latter date they were 7.2 percent higher than on October 15, 1949.

Table 2 - Retail Price Indexes for Foods and Fishery Products,
October 15, 1950, with Comparative Data

Item	Base	I n d e x e s		
		Oct. 15, 1950	Sept. 15, 1950	Oct. 15, 1949
All foods	1935-39 = 100	209.0	208.5	200.6
All fish and shellfish (fresh, frozen, & canned)	do	328.8	311.4	306.8
Fresh and frozen fish ...	1938-39 = 100	285.2	283.4	268.4
Canned salmon: pink	do	420.6	359.8	385.7

Since the increase in the prices of fresh and frozen fishery products on October 15 was only 0.6 percent as compared with those that prevailed in mid-September, the general increase in the retail fishery products index was directly attributable to the big jump in the retail prices of canned salmon. From September 15 to October 15, canned pink salmon prices jumped 16.9 percent and on the latter date were 9.0 percent higher than in mid-October 1949.



Economic Cooperation Administration Program Notes

AID TO SPAIN: United States loan aid for Spain will get underway immediately, with the Export-Import Bank of Washington acting as the operating agency, the Economic Cooperation Administration announced in November. Individual loans will be made for specific Spanish projects having prospects of making substantial contributions to the Spanish economy. The loans will be used to purchase commodities, equipment, and services for each project requiring dollar financing. There will be no bilateral agreement governing the loan aid, but all loans extended will be subject to guarantee by the Spanish Government.

AID TO THE PHILIPPINES: A "new Philippine era of progress and plenty" is stated as the goal of a United States supported aid program for the Government of the Philippines in an agreement signed in Baguio by President Truman's special representative, the Administrator of the Economic Cooperation, and Philippine President Elpidio Quirino. However, legislative action is necessary in the United States and the Philippines to put the aid program into actual operation.

The Agreement specifies that the Economic Cooperation Administration will be the agency of the United States Government to collaborate with the Philippine Council for United States aid and that the operation of ECA in the program in the Phil-



ippines will be along general lines already established by ECA in its relationships with other sovereign states.

Among other things, the Agreement states that the President of the United States intends to recommend to the United States Congress the appropriation of the necessary funds that will be required for a social, economic, and technical assistance program which will require several consecutive years of substantial aid, envisioned in the report of the Economic Survey Mission¹ at \$250 million.

A bilateral agreement is to be negotiated between the two governments to give force and effect to the pertinent sections of the Agreement.

¹/ SEE PP. 52-4 OF THIS ISSUE.



ECA Procurement Authorizations for Fishery Products

No procurement and reimbursement authorizations for fishery products (edible and inedible) were announced by the Economic Cooperation Administration during November 1950. In addition, no cancellations or decreases affecting previous authorizations for fishery products were reported.

ECA procurement authorizations for fishery products from April 1, 1948, through November 30, 1950, amounted to \$29,111,000 (\$16,442,000 for edible fishery products, \$11,129,000 for fish and whale oils, and \$1,540,000 for fish meal).

During November there was an authorization for a product which is not generally included among the procurement authorizations for fishery products—\$100,000 to be used by the Federal Republic of Germany to purchase pearl essence and sheep guts from the United States and Possessions.



ERRATUM FOR OCTOBER 1950 ISSUE

In the October 1950 issue of Commercial Fisheries Review, p. 30, in the news item "Limit of Expansion for East Coast Rosefish Fishery Reached," the last sentence in the first paragraph should have read: "From a small beginning in the mid-30's, the catch has exceeded 237 million pounds for the past two years." The catch was incorrectly given as 327 million pounds.



International

WORLD OUTLOOK FOR FISHERIES PRODUCTS--1950:^{1/} Production and Prices: After an upsurge which began in 1945, world landings of fish now seem to be stabilizing at the 1948 level, which the Food and Agriculture Organization (FAO) estimates to be in the neighborhood of 25 million metric tons. In Europe, where the returns from the North Sea are noticeably smaller, total quantities landed in 1949 amounted to some 5.7 million metric tons as compared with 5.9 million tons in 1948. In North America, 1949 landings were estimated at 3.6 million tons, compared with 3.2 million tons in 1948. In South America, 1949 landings have been estimated at 435,000 tons, compared with 425,000 tons in 1948. In Japan, which is the only country in Asia for which complete statistics have been reported, 1949 landings amounted to some 3.175 million tons against 2.45 million tons in 1948. Prices of fishery products generally declined in 1949, however, owing to larger supplies and lower prices of competing foods. Lay-up of craft because of depressed markets increased somewhat, and net income of fishermen generally declined. Great interest has been shown in the expansion of fisheries in underdeveloped areas, but such programs take time; no significant increase in world landings is expected during the next few years.

Reports from eight countries, which in 1949 accounted for 6.4 million metric tons or 25 percent of world landings, indicate an over-all increase of some 16 percent for the first five or six months of 1950 over the same period during 1949. This, however, is basically due to a large increase of herring landings in Norway, of which 85 percent was converted to oil and meal. For the individual countries, 1950 landings as percentages of 1949 landings were as follows: Canada 114, Denmark 99, Iceland 103, Ireland 98, Netherlands 87, Norway 137, United Kingdom 95, and United States 116.

The continued expansion, at high costs, of fishing fleets in many countries contrasts with relatively moderate increases in catch, sharply rising operating costs, and slowly declining fish prices. The United States 1949 monthly index of wholesale prices for edible fisheries products (1947=100) averaged 101.7, compared with 110.0 for 1948. The index for May 1950 was 94.7, compared with 100.9 in May 1949; in July 1950 it reached 97.5 as compared with 96.8 in July 1949. The "Consumers Price Index for Moderate-income Families for Large Cities Combined" in the United States showed a 7-percent decrease in fish prices from May 1949 to May 1950. In the United Kingdom, where cod has been described as flooding the rather sluggish markets, average prices for this species went down from about £38 per metric ton in January-July 1949 to about £29 in the same period of 1950. In a few other countries a different trend is shown: Canada's wholesale index increased, and in Norway prices to fishermen during the 1950 spawning cod season went above the fixed minimum.

^{1/} ABSTRACTED FROM THE WORLD OUTLOOK AND STATE OF FOOD AND AGRICULTURE-1950 (OCTOBER 1950), FOOD AND AGRICULTURE ORGANIZATION.

World Fisheries Status and Outlook: The fishing industry is in the painful process of adjusting itself to keener competition with other foodstuffs, now available at lower prices and in greater abundance. In March 1950 Iceland, heavily dependent upon fish exports, devalued the krona specifically to stimulate such exports. In the United Kingdom, the wh'tefish and herring industries were experiencing a serious crisis, and on July 5, 1950, subsidies were introduced for six months to assist catchers of whitefish in the near and middle waters, including inshore fishermen. Further restrictions on imports may be considered. In Portugal, a great number of sardine fishing craft were showing deficits in their operations. Increasing lay-ups of fishing craft, owing to lack of profitable markets, have been reported.

The decline in demand for fish appeared to be primarily a result of the greater availability and often lower prices of competing foods. In an attempt to attain a higher degree of self-sufficiency in food supply and a more diversified economy, fisheries have been expanded in consuming countries which used to import considerable quantities. Also, the fleets, in countries where war damage was great, have now been reconstructed and imports have been cut down.

A large increase in the quantity of salted cod produced during 1950 and a further decline in production of the less expensive varieties of salted herring also are likely. Production of oil and meal will probably increase further, even without the impetus of more favorable prices, because that is the best outlet when other channels are not as favorable. Prices of fisheries products might be prevented from slipping further to lower levels, and be stiffened at present or even higher levels should an appreciable increase in the prices of competing foodstuffs emerge. It is to be noted, however, that the changing economic pattern as influenced by the international situation might result in sharp increases in labor and other operating costs. With generally higher consumer incomes in 1950-51 and 1951-52, and intensified demands for most foodstuffs, the demand for fisheries products should tend to strengthen, with prices holding or rising somewhat on some products.

Fresh and Frozen Fish: The quantities of fish marketed as fresh and frozen in 1949 were, according to reports from 15 countries, somewhat larger than in 1948, but this situation has been changing rapidly during the first few months of 1950, when demand from importing countries declined.

In the United Kingdom, imports of fresh and frozen fish during January-July 1950 amounted to only 62,200 metric tons as compared with 119,000 tons during the same period in 1949 and 137,000 tons during the same period of 1948. Such changes in the supply pattern of the principal European consuming centers are also reflected in the export statistics of the principal suppliers. Iceland's export of fresh and frozen fish during January-July decreased from 94,500 metric tons in 1949 to 34,400 tons in 1950. The export statistics of Norway show a considerable decline in the exports of fresh fisheries products excluding herring: 16,600 tons during January-May 1950, compared with 32,800 tons during the same period of 1949.

Salted Fish: In Europe, much larger quantities of ground fish are being salted and it is likely that world production of salted cod in 1950 will exceed 300,000 metric tons, which is expected to meet the demand. The increase is mainly owing to the switch from fresh and frozen products which is now taking place in Iceland, dictated by drastic cuts in the imports of fresh fish into European markets, particularly Germany and the United Kingdom.

For salted herring there will possibly be a further decline in production, owing to a relatively unfavorable market outlook for this product. During the 1950

winter-herring season in Norway, the quantity salted was reduced to about half of what it was in 1949.

Canned Fish: Production of the relatively high-priced canned sardines, such as that in the countries of Southern Europe, hinges almost entirely on the availability of fish, which has been very low during recent years. Disruption of the prewar marketing pattern has caused difficulties for established producers and for new producers just entering the field. There is a downward tendency in the prices of less expensive canned sardines. Canned salmon will probably be produced in the same quantity, stimulated by a relatively good market outlook in the United States. However, competition from the U.S.S.R. may tend to reduce the European market for North American exports.

United States production of tuna, which reached a peak in 1949, also increased during 1950. The U. S. market, by far the most important, may not be able to absorb much larger quantities. U. S. domestic producers have expressed some fear of competition from Japan and other countries where tuna packing is being revived or initiated.

Oils and Meals: It appears likely that a relatively larger proportion of the 1950 landings of herring and allied species, and in some countries other species as well, will be converted into oils and meals. Both body-oil and liver-oil prices have dropped considerably since World War II. Fish meals from soft-currency countries still move relatively easily; in the United States and Canada, production faces competition with imports and with the synthetic "animal protein factor." Whether fisheries largely based on oil and meal production can be operated at a profit during the next year may largely depend on the extent to which recent technological improvements--which are being worked on diligently--can be applied to match the increasing competition from other products.

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FAO HERRING TECHNOLOGICAL MEETINGS: The United States Government was represented at the two herring meetings convened by the Food and Agriculture Organization (FAO) at Bergen, Norway, September 24-30, 1950. Delegates of 12 countries attended--Belgium, Canada, Denmark, Finland, France, Iceland, The Netherlands, Norway, Sweden, United Kingdom, United States, and Western Germany; and representatives from the FAO and the International Council for the Exploration of the Sea.

The first meeting--the FAO Meeting on Herring Technology--convened on September 24 and adjourned on September 29, 1950. It was concerned with technological problems related to the processing, marketing, and distribution of herring.

Harold E. Crowther, Chief, Technological Section, Fish and Wildlife Service, U. S. Department of the Interior, was the United States delegate, and Herbert C. Davis, President, Terminal Island Sea Foods Ltd., Terminal Island, California, attended as adviser.

The discussions during the week were concerned with the marketing of herring products in countries undersupplied with proteins; the marketing of various special herring products, such as, dried herring, canned herring, etc.; the development of new herring products; preservation methods of herring (fresh, frozen, and canned); production of fish meals and oils; and new reduction processes.

The second meeting--FAO Meeting of Fisheries Technologists--convened on September 29 and adjourned on September 30, 1950. Included in the agenda were discussions on the desirability of cooperation between fisheries technologists of the

various countries; arrangement for coordination of research and for cooperation between technologists in the same field; the region which such cooperation should cover; field covered by existing research programs in which international cooperation might be desirable; and need for extending field of research. This meeting was attended principally by the same delegates who attended the first meeting.

These meetings were an outcome of the FAO herring meeting held in The Hague, the Netherlands, in August 1949. One of the conclusions of the meeting last year was that in view of the existing trend towards a surplus in the herring industry, efforts should be made to find new outlets for herring products.

The following list of papers presented at the meetings will give an idea of the scope and subjects of the discussions:

THE UTILIZATION OF HERRING, BY G. A. REAY, UNITED KINGDOM.

HERRING, THE RAW MATERIAL, BY OLAV NOTEVAP, NORWAY

FACTORS INFLUENCING SUPPLY OF AND DEMAND FOR HERRING, BY G. M. GERHARDSEN, CHIEF ECONOMIST, F.A.O.

EFFORTS TO INCREASE SALES AND EXPORTS OF HERRING PRODUCTS, BY H. H. GOODWIN, SCOTLAND.

POSSIBILITIES FOR EXPORTING HERRING PRODUCTS TO ASIA AND THE FAR EAST, BY G. L. KESTEVEN, F.A.O.

HERRING PRODUCTS IN THE BRITISH DEPENDENCIES, BY C. F. HICKLING, UNITED KINGDOM.

FISHERY PRODUCTS OF INDO-CHINA, BY J. WESTENBERG, INDONESIA.

A REVIEW OF THE TECHNOLOGY OF BRITISH COLUMBIA HERRING PRODUCTS INVESTIGATED AT THE PACIFIC FISHERIES EXPERIMENTAL STATION OF THE FISHERIES RESEARCH BOARD OF CANADA, BY NEAL M. CARTER AND BASIL E. BAILEY, CANADA.

SALTED AND SPICED HERRING, BY D. J. VAN DIJK, THE NETHERLANDS

HERRING--DELIKATESSEN AND MARINATED PRODUCTS (SEMISTERILE HERRING PRESERVES), BY GEORGE BORGSTROM, SWEDEN.

PRESERVATION OF HERRINGS BY SMOKING AND DRYING, BY C. L. CUTTING, UNITED KINGDOM.

HOT SMOKING OF HERRING BY F. BRAMSNÆS AND HALVOR PETERSEN, DENMARK.

HERRING CANNING, BY J. G. H. HUNTLEY, UNITED KINGDOM.

THE PRESERVATION OF FRESH HERRINGS, BY G. A. REAY AND J. M. SHEWAN, UNITED KINGDOM.

FREEZING OF HERRING, BY EIRIK HEEN AND OLOF KARLSEN, NORWAY.

FREEZING AND COLD STORAGE OF HERRINGS, BY A. BANKS, UNITED KINGDOM.

NEW REDUCTION PROCESSES, BY GUDMUND SAND AND TRYGVE SPARRE, NORWAY.

THE PRODUCTION OF HERRING OILS, BY J. A. LOVERN, UNITED KINGDOM.

FISH SOLUBLES, BY GUDMUND SAND AND TRYGVE SPARRE, NORWAY.

FAO is preparing a complete report on the meeting which will include all the papers presented at the meetings. Copies of the report will be available from FAO at a later date.

Note: ALSO SEE COMMERCIAL FISHERIES REVIEW, OCTOBER 1950, P. 73; SEPTEMBER 1950, P. 58; DECEMBER 1949, PP. 21-4.

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FAO CONFERENCE CONCLUDES SPECIAL SESSION: A Special Session^{1/} of the FAO Conference met at its Washington headquarters November 3-11, 1950. Preceding it, the 18-government Council of FAO met beginning October 25. With the Food and Agriculture Organization's move to permanent headquarters in Rome, this was probably the last meeting of the Conference at its Washington headquarters.

The FAO Conference's last few days of the meeting were taken up with full Conference sessions to consider a number of matters, including the reports of the Conference committees, according to a news release from the National Conference of Non-Governmental Organizations on FAO.

Some of the main actions that the Conference took were:

Commodity Problems: The Conference decided to continue the Committee on Commodity Problems and to broaden the scope of its work. One of the first jobs the Committee will have to do under its expanded terms of reference is to analyze the recommendation of the International Cooperative Alliance for establishing a World Surplus Commodity Co-operative.

Technical Assistance: After a discussion of FAO's technical assistance work, the Conference endorsed the way the program is being conducted. It adopted resolutions proposed by several governments, including one that the U. S. Delegation drafted. The U. S. resolution asked the Director-General in preparing future budgets and work programs to include information on technical assistance so that the technical assistance programs and regular programs can be looked at and evaluated together.

The U. S. resolution also asked the Director-General to provide for getting technical information to the individual producer.

The Conference voted to draw the attention of the Economic and Social Council to the fact that in many cases capital investment will be needed along with technical assistance in order to achieve economic development and raise living standards.

Regional Offices: The Conference agreed to abolishing the European Regional Office but requested that the Director-General maintain the technical and coordinating services for Europe in whatever way he thinks best. The question of additional subregional offices in Latin America was also left up to the Director-General. Latin American offices are already located at Santiago, Chile; and Rio de Janeiro, Brazil. The proposed North American Regional Office was approved, with the understanding that liaison with the UN and its agencies in North America would be maintained direct with the Rome headquarters.

A Near East Regional Office was the last item on the Conference agenda and was considered separately from the other regional office discussions because it was placed on the Conference agenda as a separate item by the Government of Israel. It was agreed that the Director-General would work out the most suitable arrangements for rendering FAO's services to Israel.

Long-Term Trends: The Conference requested the FAO Council to appoint a small working party to study the long-term problems of FAO and advise the Director-General on the formulation of his programs of work and budgets for 1952 and 1953. The working party would be composed of representatives of members of the Council selected on an individual basis because of their special abilities in the matters being considered.

Program and Budget: The Conference adopted the report of the Committee of the Whole which considered the program and budget. Among others, this action authorized the Director-General to plan his work on the basis of \$4.5 million, and to set a fund to provide for the costs of moving to Rome. These removal costs may reduce the program budget by as much as \$300,000.

The Conference approved the Report of the Special Committee on the Scale of Contributions, which maintains the U. S. contribution at its present level for 1951.

New Members: Five new members were voted in by FAO at this Conference, bringing the total membership to 68 countries. The new members are the Federal Republic of Germany, Viet Nam, Cambodia, the Hashemite Kingdom of Jordan, and Spain. All were approved by more than the two-thirds majority required by FAO's Constitution.

Officers: The Conference continued its chief officers, the Director-General and the independent Chairman of the Council, in office for another year. Norris E. Dodd will continue to be Director-General during 1951 and Viscount Bruce of Melbourne will preside over sessions of the FAO Council during the coming year. The Conference set up a committee to consider nominations to fill these positions and to be presented at the 1951 conference.

Constitution Amended: Amendments to FAO's Constitution were adopted in accordance with the recom-



^{1/} SEE COMMERCIAL FISHERIES REVIEW, NOVEMBER 1950, PP. 75-6.

mandation of the drafting committee. The main exception was that the Conference voted to continue three-year terms for members of the FAO Council instead of the four-year terms recommended.

Korean Relief: The Conference authorized the Director-General to cooperate fully with whatever administration for Korean relief and rehabilitation is established by the General Assembly. It approved the action of the Director-General in offering FAO's help.

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MEETING OF THE INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA: The Permanent Council for International Exploration of the Sea held its 38th meeting in Copenhagen, Sweden, from October 2-10, 1950, an American Embassy dispatch from Copenhagen dated October 13, 1950, states.

According to a summary of the meeting by the Secretary General of the Council, about 125 delegates and experts from 12 European countries (Belgium, Eire, Finland, France, Great Britain, Iceland, Norway, The Netherlands, Portugal, Spain, Sweden, and Denmark) attended the meeting.

The meeting was opened at Christiansborg Castle on October 2 by the President, Dr. K. A. Andersson, Stockholm. The President and the four vice-presidents were re-elected. The other meetings were held at Charlottenlund Castle, where the work was performed in a number of subcommittees, partly area-committees, partly committees with special assignments (for example, the study of herring, salmon, and trout, whales, crustacea, hydrography, plankton, and statistics).

Results of the work of the committees were submitted to the Council at its final session on October 10. It was decided that in 1951 a scientific meeting concerning the effects of the hydrographic conditions (temperature and degree of saltiness, oceanic currents, and aliment salts) on fish and fisheries shall be held simultaneously with the Council's full meeting. Furthermore, it was decided that the committee shall establish a long-term program valid for the total area of the Council which includes the waters from the North Atlantic Ocean and adjacent waters, including Greenlandic and Icelandic waters, to the equator.

The chairman of the herring committee was requested to obtain the opinions of the council members concerning the use of echo-sounding gear and asdic for localization of the shoal of fish. This document will be sent to the manufacturers of these instruments with an invitation to them to submit their replies. Also, a subcommittee for investigation of whether or not protection of the salmon in the ocean is necessary was established.

At the meetings of the herring committee, it was pointed out that marking of herring has given interesting results. It was, for example, ascertained that herring marked at Iceland was re-caught at Norway and vice versa. This confirms a previously expressed theory to the effect that the North Icelandic and the Norwegian spring herring is of the same breed. The marking further has shown that herring caught on the western coast of Sweden immigrates to the western part of the North Sea, about Fladen Grund and Dogger Bank. A Norwegian fishery biologist has studied the fluctuations of Norwegian herring fisheries and has found that periods of good and poor fishing alternate. The poor periods on the western coast of Norway compound with good herring fisheries periods on the south-east coast of Norway and the Swedish Skagerak coast. As there has, during recent years, been a good period, he is of the opinion that we are now facing a poor catching period and that simultaneously the Skagerak coast will have a rich herring period. However, this theory is opposed by, among others, Swedish fishery biologists, who were of the opinion that herring caught on the western coast of Sweden is of another breed than the Norwegian spring herring.

The transplanting of plaice which for a number of years has been performed in Denmark now will be tested also in Norwegian and Swedish waters. At the meeting agreement was reached concerning a number of details related to the practical adjustment of such tests.

Concerning the stock of salmon in the Baltic, a Swedish fishery biologist pointed out that the reason for the extraordinarily large catches in these waters by Swedish and Danish fishermen is attributable partly to some larger year crops, and partly to the Russian embargo for Baltic fishermen to fish salmon in the open sea. All attendants of the meeting agreed that the small salmon should be protected, because the growth of the salmon in the sea is very fast.



American Samoa

STATUS OF THE FISHERIES, 1949:^{1/} Fishing in American Samoa is primarily subsistence fishing, both for reef products and offshore fish, such as bonito and shark, according to the annual report of the United States to FAO. Reef products, such as small fish, shellfish, and edible seaweeds, provide a large part of the available protein and mineral factors in the diet for a large segment of the population. No records are available as to the amount of fish caught in the area.

The commercial fish cannery^{2/} established a year ago in this area has not been able to operate due principally to the fact that while fish are plentiful on the fishing grounds, no successful methods have been devised to catch them in large enough quantity for economical operation of the factory.

^{1/} ABSTRACTED FROM THE ANNUAL REPORT OF THE GOVERNMENT OF THE UNITED STATES OF AMERICA TO THE FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (SEPTEMBER 1950).

^{2/} SEE COMMERCIAL FISHERIES REVIEW, SEPTEMBER 1950, PP. 52-53.



Canada

LONG-LINING EXPERIMENT OFF NEWFOUNDLAND: Two boats have been used this summer in long-lining operations off Cape Bonavista, Newfoundland, to determine whether this type of gear would be profitable for cod fishing in that area, reports the August 1950 Trade News of the Canadian Fisheries Department. These two boats were chartered for the experiment by that Department.

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FISHERMEN REPORT MANY EUROPEAN VESSELS ON THE GRAND BANKS: Skippers of Canadian fishing vessels arriving in St. John's report a great number of French, Portuguese, and Spanish fishing craft operating on the Grand Banks off Newfoundland, the September 1950 issue of the Canadian Department of Fisheries Trade News reports.

These vessels are reported to range in size from the small 58-ton Spanish trawlers to 1,000-ton ships. The captain of the Newfoundland vessel Blue Spray says that recently he counted the lights of 38 vessels in one night. Most of the foreign vessels are Spanish trawlers carrying crews of 15 men. They fish in pairs, towing a net between them. So far this year, 65 Spanish vessels have called at St. John's for supplies and repairs. Most of them were "salt fishing." At least 17 Portuguese fish-

ing vessels have been noted on the banks off Newfoundland, and another 46 from that country have operated off Greenland; this season 48 French vessels have visited the banks, 15 of them after fresh fish.



China (Communist Mainland)

STATUS OF FISHERIES, 1950: China's (Communist mainland) production of fishery products during 1950 will amount to 736,000 metric tons, according to the Marine Products Control Bureau of the Ministry of Food Industry. The 1950 catch will be nearly double that of the previous year, but still less than half of the highest level in the past, according to an October 10 American consular dispatch from Hong Kong.

While the Government efforts were largely directed to regrouping the old-fashioned private fishing industry along the lines of cooperatives, steps have also been taken to develop the State fishing industry in order to make full use of the country's marine food resources.

The Fishery Industry Conference held this February assigned to East China the task of producing 244,000 metric tons of fish for the current year. To assure the successful accomplishment of this task, the Food Processing Industry Ministry of the Central People's Government allotted to East China certain quantities of foodstuffs, salt, and money as loans. Another loan was extended to the fishery industry in the Chusan Islands in May, at which time they were taken over by the Chinese Communists.



Denmark

FISHING FLEET EQUIPPED WITH AMERICAN SONIC DEVICES: Denmark's fishing fleet has been equipped with more than 150 American sonic devices which track fish schools electronically, according to a news release from the Economic Cooperation Administration. These fishing boats catch 30 percent more fish than those without sonic devices, the fishermen state. Fishing, Denmark's third most important enterprise after farming and manufacturing, is a big foreign currency earner.

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INTERNATIONAL MEASURES TO REGULATE FISHING IN NORTH SEA: On several occasions during recent years Danish observers have called attention to the increasing trend in revival of German fishing activities in the North Sea and the desirability of German participation in fish protection measures in that area where, according to some quarters, over-fishing has already reached serious proportions.

The Danish Minister of Fisheries touched upon this point and on the general situation with regard to international measures for protection of the fish populations of the North Sea, when replying to questions in the Landsting (Upper House) on October 12, 1950, during discussions of bills providing for a thorough revision of Danish fisheries legislation. The situation with regard to international measures to regulate fishing in the North Sea was described by an October 31 American consular dispatch from Copenhagen as follows:

A conference in London in 1946, which was attended by a United States observer, drew up the "Convention of April 5, 1946, Governing the Fixation of the Mesh-Size of Catching Equipment and the Minimum Size of Fish" (the so-called "North Sea Convention") which was signed by all participating countries (Belgium, Denmark, France, Great Britain and Northern Ireland, Iceland, Norway, Poland, Portugal, Spain, Sweden, and The Netherlands). Western Germany was not represented, presumably due to its political status at that time. The Convention was ratified by Denmark on April 11, 1947, and has now been ratified by all the signatory powers except Belgium. Article 14 of the Convention requires ratification by all ten signatory powers in order to become effective. The most recent information indicates that there is some likelihood of a change in the Belgian attitude which might remove this last obstacle to enforcement of the Convention in the near future.

Realizing the deficiency of the entire protection campaign if Western Germany remained outside international efforts, the Nordic countries have never relinquished their interest in drawing Western Germany into the program. At their meeting in Uddevalla, Sweden, during the summer of 1950, the three Nordic Ministers of fisheries agreed to take active steps to this effect. An inquiry directed to the British Government revealed that the changed political status of Western Germany precluded the possibility of Great Britain taking any initiative. However, a summer meeting in London of fishermen from all the Convention countries included the German question on the agenda; meetings were resumed at Gothenburg, Sweden, on October 12, 1950, by Danish, British, Dutch, French, Norwegian, and Swedish delegates and were attended by German observers. According to early unofficial reports from the Gothenburg meeting, the Germans, after stating that the subject of German participation in the North Sea Convention had never been brought to the attention of responsible fisheries quarters in their country, declared their interest in the program and their willingness to take it up for consideration by pertinent trade interests and authorities.



Dominican Republic

FISH OIL DUTY RAISED: In the latest of a series of changes in import duties on certain fats and oils, the Dominican Republic has raised sharply the duty on fish oil from about 3 cents to nearly 14 cents per pound. This change, according to the American Embassy at Ciudad Trujillo, was sanctioned by Dominican Law No. 2511 of September 16, 1950, published in the Gaceta Oficial of September 20, 1950.

It would appear with this increase in duty on fish oil that supplies of this item again are ample.



Formosa (Taiwan)

FISH PRODUCTION DECLINING: Fish production in Formosa has been decreasing in recent months, according to the Provincial Agriculture Commissioner and as reported by an October 18 American consular dispatch from Taipei. This decline is due chiefly to:

1. Strict and complicated control measures adopted by coast guard troops

2. Shrinkage of fishing areas
3. Shortage of rice supply
4. Steady increases in the prices of fuel oil for fishing boats
5. Shortage of working capital
6. Heavy tax burden on fishermen

Because Formosa's present population needs annually 150,000 metric tons of protein food (of which fish is an important component) and the fish production at present amounts to only 70,000 metric tons per year, it is planned to encourage pisciculture.



German Federal Republic

FULL-SCALE MODEL OF GERMAN ELECTRICAL FISHING DEVICE READY TO BE TESTED: In mid-October the inventors of the German electrical fishing device completed the installation of a full-scale experimental model of the device on their boat, the former mine-sweeper R 96. The long delay in completing this installation was caused by the desire of the inventors to have certain modifications built into the machinery and to the long period required by the manufacturer to make these modifications. The inventors state that they will begin to make field-strength measurements shortly and then will go to sea for actual fishing tests if the machinery will lay down the desired field strength, states an October 17 American consular dispatch from Bremerhaven.

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SUPPLY OF SUBSIDIZED FUEL TO FISHING FLEET CUT: Fresh- and salt-water fisheries and agriculture, inland shipping, and ocean shipping, receive allocations of Diesel oil at lower prices than those paid by non-privileged users. Sea-fisheries vessels pay DM120 (\$28.56) per metric ton for medium Diesel oil, while non-privileged users pay DM380 (\$90.44) per ton. The Federal Government makes a profit of about DM45 (\$10.71) per ton on sales to non-privileged consumers and loses about DM215 (\$51.17) per ton to privileged consumers. From the profits made on the sale of Diesel oil to the non-privileged consumers, the Federal Government pays the subsidy on the oil sold to the privileged consumers, according to a September 8 American consular dispatch from Bremerhaven.

Due to a decision not to subsidize privileged consumers from funds other than petroleum-sale profits, the Federal Finance Ministry found it necessary at the end of July to reduce all allocations for subsidized Diesel oil. The allocation for the high seas fisheries was cut 30 percent for the third quarter of 1950 with the result that many fishing cutters have had to tie-up during September. The cutter fishers cannot afford to pay the higher price for fuel as they are now marginal producers. The announcement of the reduction in allocations retroactive to July 1, 1950, came too late to allow many cutter fishers to plan their fishing trips so as to stretch out as much as possible their limited fuel allocation, and thus to avoid the necessity of tying up their vessels for a long period at the end of the quarter.

The cut in the supply of subsidized fuel allocations to the high-seas fisheries will not greatly reduce fish landings as only a part of the cutter fleet will be forced to stop fishing. Few German trawlers are motor trawlers and in any case the operators of the motor trawlers probably will find it cheaper to buy Diesel oil at DM380 (\$90.44) per ton for one voyage or so than to tie up their vessels.

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NEW GERMAN TRAWLER: A new fishing trawler, Schlesien, was launched in June 1950 by a Bremerhaven shipyard. The vessel is 170.5 feet long, with a beam of 28.7 feet,



THE SCHLESSEN--TYPICAL OF RECENT GERMAN FISHING--TRAWLER CONSTRUCTION.

and draws 18.5 feet when loaded. It has a 750 h.p. reciprocating marine steam engine and a capacity of 250 metric tons of fish. The Schlesien, measuring 570 gross registered metric tons, is typical of recent German fishing vessel construction.

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PROPOSED REVISION OF DUTIES ON FISHERY PRODUCTS: The proposed new German import tariff drawn up for presentation at the international trade talks (which began at the end of September in Torquay, England) changes all duties on fishery products, a November 2 American consular dispatch from Bremerhaven states. The new tariff has 21 sections and 99 chapters; chapter 3 prescribes, among other things, duties on fish and semi-manufactured fish products while chapter 16 contains the provisions pertaining to manufactured fish products.

The new tariff classifies fish and fish products as follows:

<u>Chapter No.</u>	<u>Tariff Item No.</u>	<u>Brief Description</u>
3	0301	Unmanufactured fresh or salt-water fish other than shellfish
3	0302	Dried or salted fish, not smoked
3	0303	Smoked fish
3	0304	Unmanufactured lobster, crayfish, shrimp, etc.

<u>Chapter No.</u>	<u>Tariff Item No.</u>	<u>Brief Description</u>
3	0305	Unmanufactured oysters, mussels, etc.
16	1604	Manufactured fish other than shellfish
16	1605	Manufactured shellfish

The chief fishery product imported by Germany is fresh herring. For this item, a 5 percent ad valorem duty is proposed in place of the existing duty-free status. Since the German trawler fleet is able to land only enough fresh herring to keep the German herring processors supplied with raw material during the months August to December, imports of fresh herring are required during the remainder of the year by the German industry. The 5 percent duty placed on fresh herring is regarded more as a bargaining point than as a protective duty.

However, the situation is different in respect to salted herring. Salted herring producers the world over have been suffering from the continued decrease in the consumption of salted herring in countries not behind the Iron Curtain. The German salted herring producers in Vegesack, Glueckstadt, and Leer have been particularly hard hit since about $\frac{2}{3}$ of their prewar markets now lie behind the Iron Curtain. Accordingly, a 12 percent ad valorem duty on salted herring is proposed in the new tariff to give the domestic industry at least the same degree of protection as in the past.

On fresh fish (other than herring), the proposed duties range from 10-15 percent ad valorem in contrast to the present duty of DM10 per 100 kg. (about 1.1 cents per lb.). Since at present price levels the old specific duty is equivalent to an ad valorem duty of 20 percent, the proposed new duty represents a reduction. However, the 10 percent duty is designed to reserve the domestic whitefish market for German producers except during the German herring season. The German trawler fleet is believed able to catch enough cod, pollock, and haddock to meet German whitefish needs at other times.

A 10 percent duty is levied on eels in the draft tariff as a compromise between the desires of the processors who formerly were able to obtain much of their needs in raw materials from the Baltic coast regions now behind the Iron Curtain and the desires of the fishermen in Western Germany who wanted the same measure of protection as was available under the 1902 tariff.

For smoked fish, a 20 percent duty is proposed in order to reserve the domestic market for German processors. Since Germany is dependent to a great extent upon herring imports, the 20 percent duty on smoked herring is designed to insure that the herring is imported in an unprocessed form. Germany has adequate capacity to process and use herring meal and oil. If Germany imports crude rather than smoked herring, her need for fish meal and fish oil imports will be accordingly smaller.

The duty proposed for manufactured fish products ranges from 30 percent to 40 percent, because in the German view the advantage of foreign fish canners in being able to purchase tin plate, condiments, etc., at much lower prices than the domestic canners, must be compensated, and because some of the products falling under this heading, e.g. caviar, strictly are luxury items.

One of the chief endeavors of the German delegation at Torquay will be to persuade foreign countries to lower duties on German manufactured goods. As a bargaining point, the German delegation may offer to lower German duties on raw materials, generally, and foodstuffs, in particular. Because of this tendency, German fishing interests show considerable reserve toward the Torquay conference.

However, the draft tariff which the German delegation took to Torquay embodies to a large degree the wishes of the German fishing interests. These fishing interests foresee an annual German production of 500,000 metric tons of fish with a consumption of somewhat under 700,000 tons of fish landed weight. They believe imports should be limited to about 160,000 tons of fresh herring during the first half of each year and perhaps 20,000 tons of fresh white fish during the German herring season. The duties provided for in the draft tariff will tend to restrain German imports to these amounts, deemed desirable by the fishing interests, although at the present time the limits set on the importation of the chief trade items in the various bilateral agreements and in exchange-allocations furnish more protection to the German fishery products producers than does the customs tariff.

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GERMAN CRITICISM OF WHALING PROHIBITION: At the present time, no German firm may operate a whaling vessel under the German flag due to restrictions by the Occupying Powers. Before the 1950-51 season, no German firm had a part in the operation of a whaling vessel under any other flag, but the former American T-2 tanker, Herman F. Whiton, is expected to operate in the Antarctic in the 1950-51 season under the Panamanian flag for the Erste Deutsche Walfang Gesellschaft, a Hamburg firm, an October 11 American consular dispatch from Bremerhaven reports.

In the 1930's, one of Germany's whaling fleets used Bremerhaven as a home port and brought increased income to the city. The Bremerhaven Industrie- und Handelskammer is actively supporting German efforts to have the whaling prohibition lifted. The German representative in the Ocean Fishermen's Section of the International Transport Workers Federation brought in a resolution at the August 1950 meeting asking that the Federation try to get the ban lifted. Although the reports available do not indicate that favorable action was taken on this proposal, it is considered that by moving such a proposal, the representatives of German labor demonstrated an active interest in the question of the whaling prohibition. It is believed to be only a matter of time before the ban will be removed, but in the meantime it is expected that agitation against the ban will continue to be active.

Background of German Whaling and Consumption of Whale Oil: In the last years before World War II, Germany's consumption of whale oil averaged 180,000 metric tons per year or about 37 percent of the world's production at that time. During Germany's drive for self-sufficiency in the 1930's, her whaling fleet was expanded to comprise 5 German-owned and 2 chartered factory ships and over 60 killer boats. Germany was thus able largely to meet domestic demand with its own production. A number of refineries and hardening plants were constructed to process the landed whale oil, which became a very important ingredient in the production of margarine and other edible fats.

Norway is the only country now producing whale oil in excess of domestic demand. Norwegian whaling fleets produce about 180,000 metric tons of oil per year, of which only some 30,000 tons are needed to satisfy the home market. The only other large producer, England, has placed whale oil under government control so that none is exported and large quantities (1949--50,000 tons) are imported from Norway. The result is that Germany has been able to obtain only 10 percent as much whale oil as before the war, and has had to pay a price eight times the prewar average for this oil.

Due to a world oversupply in 1938, whale oil No. 1 brought about \$50.00 (DM150.00) per metric ton in that year. With the introduction of limitations on the catch of

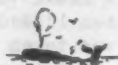
1/ ORIGINALLY IT WAS REPORTED THAT THIS ENTERPRISE WAS CONTROLLED BY AN AMERICAN COMPANY WITH OFFICES IN NEW YORK CITY, WITH THE GERMAN FIRM ACTING AS THE SOLE AGENCY OF THE AMERICAN FIRM FOR SUCH PURPOSES AS SUPERVISION AND EQUIPMENT. ALSO SEE COMMERCIAL FISHERIES REVIEW, JULY 1950, P. 34 AND P. 44.

whales in the postwar period, the price climbed to over \$4.00 per ton in 1947; due largely to the changed relationship between the dollar and the currencies of the whale-oil producing countries, the price early in 1950 was \$280 (DM1,175) per metric ton.

German margarine factories, accustomed during the 1930's to using hydrogenated whale oil, because of its good emulsifying and keeping qualities, have been forced to modify their processes to make use of other materials because of the lack of a German whaling fleet. In addition, the German plants devoted to the refining and hydrogenation of whale oil are suffering from lack of business as Norway, to keep its own refineries and hydrogenators in operation, reportedly has made sales of crude whale oil to Germany only at prices above the Norwegian domestic price and only conditional upon the purchase, at prices little above the cost of the crude oil, of "Margarit" or the hardened whale oil. The German refineries have been unable to meet this competition.

The best substitute for whale oil is herring oil. The supply of this oil again is to a large degree controlled by Norway, whose fishermen land about 15-20 percent of the world catch of herring. In any case, herring oil prices have also increased about 700 percent over the prewar figure and only small quantities are available.

Germany must expect to pay a high price for whale oil even if it is allowed to operate its own fleet. The high price is largely the result of the decreased number of whales and of the shortage of vegetable fats and oils. However, if Germany once again becomes a whale oil producer, it will not be forced to pay foreign refineries and hardeners for the processing of the oil it consumes.



Greece

ECA FUNDS AID FISHING INDUSTRY: A 12,000,000 drachma loan (about \$8,000) of Marshall Plan funds to a fishing firm of Kalamata, Greece, has had an impact upon the economy of the entire area of the Southern Peloponnesus, according to a news release from the Economic Cooperation Administration. Nearly two years ago this firm obtained the loan and fitted up a refrigerated truck for carrying fish. Previously, fish were expensive in the area, partly due to the cost of fishing in poor vessels and also due to the reluctance of fishermen to go out fishing again until they had sold their last catch. This meant that fishermen sold a few fish for a high price.



Now the picture has changed. Where they used one fishing boat before their loan and caught 400 oke (1,000 pounds) a day, this Kalamata firm now uses nine boats and has an average daily catch of 9,000 oke (25,000 pounds). Fish that previously sold for 5,000 to 6,000 drachmas per oke (12 to 14 cents a pound) in Kalamata, the port city, are now sold out in the mountain villages for 1,000 to 2,000 drachmas per oke (2½ to 5 cents per pound).

The fish are transported out of Kalamata to the villages and are making record sales at the low price. The firm has established a flourishing business; consumers are getting plentiful supplies of fresh fish daily at low cost; the mountain villages have been able to add fish to their diets; and due to the amount of fish on the markets in the area, the price of meat has dropped.

Spurred by Marshall Plan aid, more fishermen--an estimated 30,000-- are taking more fish from Greek seas than ever before. From a prewar catch of 50 million pounds annually, the take increased to over 90 million pounds last year and may surpass 100 million pounds this year.

About 40 percent of the Greek fishing boats were destroyed during World War II, and the balance of the equipment had deteriorated. Marshall Plan funds have aided in rehabilitating and building up the Greek fishing fleet.



Guam

STATUS OF THE FISHERIES, 1949:^{1/} Fishing is confined to within-reef fishing and the amount of the catch was barely sufficient to meet local demands, according to the annual report of the United States to FAO. As of December 31, 1949, persons deriving their living mostly from fishing totaled 253. During the last six months of 1949, the total catch amounted to 134,585 pounds. There are possibilities for deep-sea fishing around the waters of Guam and some outside interests are considering such an undertaking.

^{1/} ABSTRACTED FROM THE ANNUAL REPORT OF THE GOVERNMENT OF THE UNITED STATES OF AMERICA TO THE FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (SEPTEMBER 1950).



Iceland

NEW REDUCTION PROCESS TO BE USED BY NEW HERRING PLANT: The construction of a new herring plant in Reykjavik designed for the reduction of herring into meal and oil through the use of processes new to Iceland is practically completed. It is now planned to use the plant primarily for the processing of rosefish (redfish) rather than herring, a consular dispatch from that city, dated September 29 reports.

Origin: The need for a herring reduction plant in the Reykjavik area received considerable attention as a result of the exceptionally good herring catch made in the Faxa Bay (Reykjavik) area in southwestern Iceland during the 1947-48 winter months. Herring had traditionally been caught until that time in the fishing grounds off the north coast during the summer months, and reduction plants were therefore entirely concentrated in northern Iceland. The heavy costs of transporting Faxa Bay herring to the northern reduction plants, together with the high profits resulting from the unexpected herring catch in the south, were the prime factor in the proposal to build a herring plant in Reykjavik. The Municipality of Reykjavik assumed the major burden of financing the plant and now owns a 60-percent interest; the remaining 40 percent is owned by a Reykjavik trawling firm. An ECA grant furnished much of the dollar exchange needed for construction and equipment.

Equipment and Operations: The new method employed in the plant was described in a talk delivered in February 1948 by Sveinn S. Einarsson, an engineer attached to

the trawling firm and the managing director of the new herring plant. All Icelandic herring plants have been using the wet-rendering or wet-pressing method of processing herring. (Briefly, this consists of pressing the fish, after cooking, in screw-presses made for the purpose, to separate the oil together with some of the water.) The new plant, however, will be using an entirely different method of processing herring and fish for reduction purposes. The process is as follows: the fish (submerged in oil to transfer the heat) are dried under vacuum in evaporators, continuously in operation; the oil is removed from the dried fish by solvent extraction (hexane).

According to Einarsson's estimates of capital investment and cost of production for factories in Iceland with a capacity of 750 and 1,500 short tons, the gross return will be greater for a factory using the new "drying-solvent" process than for a factory using the wet-pressing process and utilizing the stickwater, and even greater when compared with one using the wet-pressing process and not utilizing the stickwater.

The new plant is located on the southern end of Orfirsey, a small island in Reykjavik harbor, connected with the mainland by a breakwater-pier, and consists of:

One building, 54.5 meters by 37.2 meters (179 by 122 feet), housing the dehydration equipment and having room for storage for processed meal.

One building, 37.6 meters by 14.2 meters (123 by 47 feet), housing the extraction equipment.

Two round storage tanks for raw fish, each with a radius of 7.45 meters (24 feet) and a reported capacity of 1,700 metric tons; space has been set aside for eight similar tanks, should they be needed.

One round storage tank for fuel oil, with a radius of 9.5 meters (31 feet) and a capacity of 2,700 metric tons (approximately 17,000 barrels); this tank is on a 5-year lease to a local oil company but the new herring company may obtain fuel from it.

One round storage tank for fish oil, with a radius of 7.45 meters (24 feet) and a capacity of 2,600 metric tons.

Two round storage tanks for hexane (the solvent used in the extraction process), each with a capacity of 30 metric tons (approximately 10,000 gallons).

One boilerhouse, 15.0 meters by 14.8 meters (49 by 48 feet).

A landing pier for trawlers to unload their catches for the plant has been built adjoining the plant in the inner harbor.

The new plant is now completely equipped for operation, except for an automatic sprinkling system (the hexane solvent is very inflammable) which is in the process of installation. Actual operations have thus far been limited to dehydration tests on sample supplies of redfish (also known as rosefish, ocean perch, and Norwegian had-dock), and a little herring last spring. A few bugs were found in the equipment at that time, but are believed to have been effectively eliminated. No test runs have yet been made on the equipment for extracting the meal and oil from the dry fish produced by the dehydration process, since it is considered too expensive to set this machinery in operation unless there is an adequate supply for two months' continuous operation. However, little difficulty is expected from the extraction equipment, which is of American manufacture and is similar to other machinery used in the United

States for processing cotton seed and soya bean. It will be necessary for a manufacturer's representative to come to Reykjavik from the United States in order to train personnel to operate the extraction machinery.

The operators of the new company, upon the basis of the tests last spring and further study, are still confident that the new vacuum dehydration and solvent extraction methods in the plant will result in a considerably more efficient reduction of herring into meal and oil. Einarsson's production estimates, modified slightly for simplification, are presented below:

Comparative Efficiency of Herring Reduction Methods

Method	Loss of Total Dry Material Content (%)	Loss of Total Oil Content (%)	Meal Obtained		Oil Obtained (% of raw weight ^{1/})
			% of raw weight ^{1/}	Protein Content (%)	
Wet-pressing	25.7	3.0	18.2	71.0	11.9
New Method	5.2	0.5	21.0	81.0	13.7

^{1/}Raw weight is for wet whole fish.

It should be noted that the herring considered for the above table has a fat content of 14 percent, taken as the average for herring found in Faxa Bay. In the 1947-48 winter, Faxa Bay herring had somewhat less fat content than this, but the herring being caught in the Bay in 1950 averaged 20-percent fat content. The estimates in the above table for meal and oil obtainable by the new processes will be proportionately lower and higher, depending on the fat content of the herring being handled.

The same measure of added efficiency will apply to rosefish (redfish) processed in the plant by the new method rather than by the wet-pressing method. The operators of the new company expect to obtain 200 to 220 kilograms (440-484 pounds) of meal from 1,000 kilograms (2,200 pounds) of wet whole rosefish. This is the same percentage as average Faxa Bay herring would produce, but rosefish meal would have a protein content of under 65 percent—much lower than herring meal. Oil obtainable from rosefish is expected to run from 30 to slightly over 50 kilograms (66-110 pounds) per ton of wet whole fish; this is less than one-third of the amount which could be expected from herring.

The new company has not been operating since it became operational this year because there has not been sufficient raw material. The plant requires 600 to 700 metric tons of wet whole herring each day for profitable operation. If an adequate supply was not immediately available, it was intended to store the raw herring in one of the tanks adjoining the plant until the necessary supply was on hand. Although the herring catch during the 1947-48 winter would have kept the plant operating at maximum capacity, that catch was unique in Icelandic fishing history, and there is no good reason to expect that it will be repeated again soon. The catches being made this year are exceptionally good, but they fall far short of the required minimum.

The operators of the plant estimate that only 400 tons daily of wet whole rosefish would keep the plant operating profitably. It has been intended for some time to concentrate on the processing of rosefish, since herring supplies cannot be counted on. However, rosefish operations have been impossible, because all of the Reykjavik trawlers have been laid up since last July 1 as a result of a labor dispute. It is hoped that some of the trawler fleet will be devoted to rosefish fishing exclusively, and that the new company will become operational soon after the present trawler tie-up is ended.

Rosefish vs. Herring: Although the new company was founded with the reduction of herring in mind, the operators of the plant are confident that the plant can operate profitably on rosefish. The smaller fat content and consequent oil output of rosefish, and the lower protein content of its meal, are offset to some extent by the lower cost of rosefish delivered to the plant as compared with herring. Whole wet herring was landed in northern Iceland this summer at 0.44 kronur per kilogram (approximately $1\frac{1}{2}$ cents per pound). At the same time, wet whole rosefish was landed in the same ports at 0.30 to 0.37 kronur per kilogram (about 0.8 to 1 cent per pound). The cost of herring from the Faxa Bay area (caught with drift nets) delivered in Reykjavik is traditionally higher than the cost of herring (caught in purse seines) in the north. Rosefish landed by trawlers in Reykjavik will be approximately as expensive as rosefish landed by trawlers in the north. It is therefore considered likely that the raw cost of rosefish will be only about one-half the raw cost of herring delivered to the new reduction plant.

Trawler operations for rosefish for reduction into meal and oil are cheaper than for fish for icing or salting; the latter two processes require labor and materials for special treatment of the fish on board. Fish caught for processing into meal and oil do not have to be gutted and cleaned on board, and will remain in satisfactory condition for a week--the length of a trip--without icing or salting.

A clear advantage in working on rosefish is that the processing season would run for 8 to 10 months of the year, the only dead time being late winter and early spring. On the other hand, a 4-months' season annually for Faxa Bay herring would be considered excellent.

Another advantage is that the plant can function efficiently on only 400 metric tons of rosefish daily, as compared with 600-700 tons of herring. It is expected that eight trawlers devoted exclusively to rosefish operations can furnish the required supply.

One prime unknown in rosefish operations is the true reserve of rosefish in the Icelandic fishing grounds. Vessels have been fishing here for rosefish for years, but not as steadily and intensively as now proposed. It is possible that rosefish supplies, after a while, may turn out to be not much more gratifying than the supplies of the lucrative but very elusive Faxa Bay herring.

Description of the New Method: DRYING OF THE HERRING: The herring is pumped into evaporators together with some oil. The oil transfers the heat from the heating surfaces of the evaporators into the herring which is in continuous movement in relation to the heating surfaces. The transfer of the heat is, therefore, very rapid even while the herring is whole. There is a vacuum in the evaporator and the steam from the herring is condensed in condensers after passing through double cyclones in order to cleanse out the oil which might pass along from the herring.

Drying completed, the evaporator delivers a "substance" consisting of the entire substance of the herring, its own oil, and additional oil which was originally pumped into the evaporator, plus a small percent of water.

This substance is fluid as it contains approximately 70 percent of oil and is consequently easily pumped.

The next step in the curing consists of separating all the free oil from the substance. This may be done in two ways, either by filtering in vacuum filters or in a special kind of centrifuge. The cake derived then contains approximately 45 percent of oil and will be called "dry herring." There is also separated some oil containing a small amount of solids.

A part of this oil or all of it, plus an additional quantity is then pumped back into the evaporator, but the quantity is decided by the fatty contents of the herring. If the herring is fat, it will not be necessary to pump all the free oil back, and then the purification of the remainder is completed by filtering through a filter-aid under pressure in pressure filters. The cake which has been formed and which consists of fine meal and filter-aid is mixed with the dry herring and hence is not lost. A filter-aid must naturally be of stuff harmless to animals for which the meal serves as fodder.

The production of the dry herring completes the first stage of the process.

THE EXTRACTION: The dry herring is introduced into the upper end of a so-named extractor and gradually moves down therein. The solvent is pumped into the lower end and it rises in the extractor, washing the oil from the herring on the way down, and finally flows from the upper end of the extractor together with the oil.

When the meal leaves the extractor, it is damp from solvent and is conveyed to a dryer where the solvent evaporates. The meal may then be ground and sacked.

The mixture of solvent and oil leaving the upper end of the extractor carries a small quantity of fine solids with it. A centrifuge cleans most of this away, but the remainder is filtered away by pressure filtering through a filter-aid. These solids are mixed with the dry herring and are, therefore, not lost.

The oil is finally separated from the solvent by distillation. The oil is thus fully recovered and purified.

Special provisions are made for the preservation of the solvent which evaporates from the meal and oil, and this is used repeatedly. Losses in it cannot, naturally, be fully prevented.

It will be seen from the above description that from a factory of this type there flows only distilled water (from the herring). The complete process occurs inside enclosed machines and no odor is carried to the environment.

This process of drying herring is protected by patents both in Iceland and other countries.

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HERRING PRODUCTION TAX ABOLISHED: Iceland's production tax on herring caught off the Northern Coast of that country, which has been in effect since March 1950, has been abolished by an announcement of the Ministry of Industry, dated October 12, 1950, published in Logbirtingablad (Law Gazette), No. 67 (October 18, 1950).

A production tax of 8 percent of the export value was levied on all herring products, except canned herring, by the Act of March 19, 1950, which devalued the Icelandic krona. The Act provided that the Government might lower or abolish the tax if herring catches were below certain minimum figures, reports an October 23 American consular dispatch from Reykjavik. Proceeds from this tax were to be used to assist the herring industry.

The abolition of the tax resulted directly from the failure of the 1950 summer herring season. Final reports indicate that only 25,754 metric tons of her-

ring were delivered to factories for reduction into meal and oil, as against 45,923 metric tons in 1949, which was also a poor year; only 55,561 barrels (7500 metric tons) were salted in 1950, as against 86,156 barrels (11,631 tons) in 1949. Consequently, receipts from the production tax were much lower than expected and of minor value in any scheme to assist the industry.

Simultaneously, with the abolition of the production tax, the price of North Coast herring delivered by fishermen was increased. The increase amounts to 5 kronur per "mal" or 135 kilograms of fresh whole herring (approximately 13 cents per cwt.) delivered to factories for processing, making the total price to the fishermen 70 kronur per mal (about \$1.43 per cwt.). The increase for salted herring amounts to 12 kronur per barrel (based on 135 kilograms of fresh whole herring) and brings the total cost to 122 kronur per barrel (about 24½ cents per cwt. and \$2.50 per cwt., respectively).



Ireland (Eire)

FISHERIES LEGISLATION TO PROTECT IRISH INSHORE FISHERMEN: The Fisheries (Consolidation) Bill of 1950, prepared by the Irish Ministry of Agriculture, was to be considered in the Dail in late October. This bill is an act to consolidate the Fisheries Acts of 1842 to 1949, and also contains certain other enactments relating to fisheries, states an American Embassy dispatch from Dublin dated October 23.

In a speech on the Fisheries Estimate before the Dail on July 4, 1950, the Minister for Agriculture declared, "It is the fixed policy of this Government.... to reserve the domestic fish market for the exclusive enjoyment of the inshore fishermen along our coasts." The present bill, which also reconstitutes the Sea Fisheries Association, has this policy as its objective and should it be approved by the Parliament, the only agency legally permitted to land fish in Ireland for consumption will be this Association acting as a statutory cooperative for Irish inland fishermen.

In the speech referred to, the Minister commented that he was deliberately asking Irish consumers to pay uneconomic prices for fish in order to create employment for these inshore fishermen. Some indication of what this concession will be was indicated by the prices existing in Dublin in October for certain types of fish as contrasted with prices existing in Aberdeen. These prices, 50 to 100 percent higher in Dublin than in Aberdeen, the Minister believed could not be defended if maintained for the benefit of a commercial enterprise but were justified "so long as we protect the inshore fishermen and so long as we aim at steadily narrowing the gap by improved efficiency and improved methods between the world's price and the price we must charge for fish in order to preserve for the inshore fishermen a reasonably modest standard of living."

Statistics on inshore fisheries employment provided by the Minister on this occasion were 1,913 men exclusively employed in fishing and 8,150 employed part-time. The numbers of motorboats and "unengined" boats used for fishing alone were 578 and 2,260, respectively, with 446 boats used part-time. The Sea Fisheries' Association handled 70,530 hundredweight (112 pounds) of wet fish in 1949, compared with 68,981 hundredweight in 1948 (7,899,360 and 7,725,872 pounds, respectively), according to the Minister, whereas the total quantities of wet fish landed in Ireland, according to the Irish Trade Journal, were 365,112 hundredweight in 1948 and 202,155 in 1949 (40,892,544 and 22,641,360 pounds, respectively).

Japan

BIOLOGICAL OBSERVATIONS ON MOTHERSHIP TUNA EXPEDITION:^{1/} The first mothership tuna expedition, using the Tenyo Maru No. 2, operated about three months (June 18-September 2, 1950) in the general area between latitudes 1° to 9° N. and longitudes 140° to 160° E. Fish caught by the expedition can be grouped as follows: yellowfin and other tunas, marlin and other spearfishes, sharks, and miscellaneous fish. In terms of weight, yellowfin tuna and the black marlin were taken in the greatest quantities. Extensive fishing and operations data were collected, and biological investigations were conducted throughout the operations, the October 7 Weekly Summary of SCAP's Natural Resources Section reports.

Scarcity of data on the abundance of the fish stocks in this general area makes it impossible to reach conclusions as to the extent of these populations or the effects, if any, of the mothership expedition just completed. Significant, however, is the fact that throughout the operations, the various species were found and taken by the tuna boats without any definite fall in catch rate. Fluctuations from day to day were observed, but more data and complete analysis of data already obtained will be required before it can be determined whether the fluctuations have any significance.

^{1/} ALSO SEE COMMERCIAL FISHERIES REVIEW, NOVEMBER 1950, P. 61; SEPTEMBER 1950, PP. 46-7; JULY 1950, P. 46; JUNE 1950, PP. 52-4.

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INCREASE IN NUMBER AND GROSS TONNAGE OF JAPANESE FISHING VESSELS: A significant increase in the number and gross tonnage of Japanese fishing vessels is noted (see table) in a report prepared by the Japanese Fisheries Agency, according to the September 30 Weekly Summary of SCAP's Natural Resources Section.

Japanese Powered Fishing Vessels (Five Gross Tons and Over)--June 1950				
Item	As of Dec. 1949	As of June 1950	Increase	Percent of Increase
No. of vessels	27,198	28,180	982	3.6
Gross tonnage (metric tons)	694,927	717,357	22,430	3.2
Horsepower (total)	1,564,000	1,644,000	80,000	5.1

Most of the increase in number and tonnage of vessels has occurred in the class of vessels ranging from 5 to 19 gross tons. This increase is reflected in the fisheries for sardine purse seiners, miscellaneous drag nets, fish carriers, and miscellaneous seine fisheries. The offshore trawling fleets showed a slight decrease in tonnage and number of boats as of June 1950, compared to December 1949. Geographically, increase in tonnage occurred principally in the Tokyo area (refrigerated ships), Nagasaki (purse-seine fisheries), Hokkaido (improved system of collecting statistics), and Aomori (pole-and-line fisheries for cuttlefish).

The present policy of the Fisheries Agency is to limit new construction to the replacement of old or sunken craft. The agency is experiencing some difficulty in enforcing this policy effectively. The Fisheries Agency recently obtained passage of legislation designed to improve surveillance over the boat-building program through coordination of the work of national and prefectural fisheries agencies.

In spite of the war (World War II) and its after effects, more and more Japanese fishing boats have had engines installed, so that the total horsepower of the fishing

fleet now is about 70 percent greater than in 1939. Even though more petroleum has been made available to the fishermen, numerous petitions for higher allocations have been filed by fishermen's groups.

Petroleum products (as well as cotton and Manila fiber) make up the principal materials which must be imported for use of the Japanese fishermen. Petroleum is purchased and imported into Japan with funds made available by the United States for the rehabilitation of the Japanese economy. Amounts of such products allocated to fisheries have increased progressively since the Surrender until in 1950 they are greater than the amount used by Japanese fishermen operating before the war.

In spite of the increased horsepower of the modern Japanese fishing fleet, however, over-all production has not increased in the same proportion. In many instances, the growth in the size of the motorized fleet has resulted in overfishing the coastal fishery resources. Under such conditions, further increases in fishing intensity would serve primarily to heighten the competition between boats for the limited amount of fish available, resulting in higher costs without a commensurate rise in returns to the fishermen. In addition, catches during succeeding years would decrease because of depletion of the fish populations.

According to a statement of policy released by the Natural Resources Section, "allocation of petroleum products sufficient to meet the requirements of the Japanese fisheries, will, within the limits of supplies available in Japan, be approved in the following cases:

1. "Where sustained or increased fishing effort will result in maintaining or enlarging production without overfishing the resources.
2. "Where overfished resources have been protected adequately against continued overfishing by (1) enactment and enforcement of effective conservation regulations, such as, reduction in the number of boats; (2) limitation of the fishing season or catch; or (3) other suitable measures."

In addition, the statement points out that increases in the allocation of petroleum products for fisheries will not be approved where there is evidence of continued overfishing caused by lack of adequate conservation regulations or effective enforcement of such regulations; and that to obtain increases the Fisheries Agency, of the Japanese Ministry of Agriculture and Forestry, must submit satisfactory evidence that the requested increases meet the other conditions of this policy.

The Fisheries Agency has indicated that it agrees with these principles for allocation of petroleum and will cooperate fully in putting them into effect.

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REDUCTION OF EAST CHINA SEA FLEET: A reduction of approximately 30 percent in the number of Japanese vessels engaged in bull and otter trawling in the East China Sea was completed on September 20, 1950, according to the October 7 Weekly Summary of SCAP's Natural Resources Section. In a letter to that agency, dated September 20, 1950, the Japanese Minister of Agriculture and Forestry reported that the operation of 310 bull and otter trawlers had been either suspended or restricted under the provisions of the Law for the Prevention of Exhaustion of Marine Resources.

Original schedules for this reduction contemplated restriction or suspension of operation of 295 vessels by December 31, 1950.^{1/} This action was based upon the results of preliminary research on fish populations in the East China Sea. Approximately 338 pairs of bull trawlers and 58 otter trawlers continue to operate in that area.

^{1/} ALSO SEE COMMERCIAL FISHERIES REVIEW, SEPTEMBER 1950, PP.49-50; JUNE 1950, P. 57.

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VIOLATIONS OF AUTHORIZED FISHING AREA: A total of 136 Japanese fishing vessels were reported during September 19, 1949-October 1, 1950, operating beyond the limits of the area authorized for Japanese fishing operations by SCAPIN 2046 (September 1949). These vessels were 3 tuna boats found beyond the limits of the fishing area in the Pacific Ocean south and east of Japan, and 5 otter trawlers and 64 pairs of bull trawlers found beyond the limits of the fishing area in the East China Sea--a total of 72 cases. Two tuna boats, four otter trawlers, and eight pairs of bull trawlers were reported by Allied authorities, the October 14 Weekly Summary of SCAP's Natural Resources Section reports. One tuna boat, one otter trawler, and 56 pairs of bull trawlers were reported by the Japanese Fisheries Inspection System.

As of October 1, 1950, the Japanese Government had taken the following punitive action in the 72 cases reported: 6 cases were under investigation by the Fisheries Agency, 10 cases did not warrant judicial action and were disposed of administratively, and the remaining 56 cases were reported to procurators. After further investigation, procurators dropped 10 of these latter cases and filed indictments in 46. Four of the 46 cases have been tried; one was dropped during trial for lack of evidence, and the accused were convicted in the other three. The sentence in each case was 10 months' penal servitude, with execution of the sentence suspended for two years.

The Minister of Agriculture and Forestry took parallel action in 17 of the 56 cases reported to procurators, revoking the licenses of two tuna boats and 29 bull trawlers. The licenses of 29 other bull trawlers were voluntarily surrendered by their owners, bringing the total to 60. Thus of the total of 72 cases, six are under investigation, 42 await trial, and in 24, punitive action has been completed.

AMERICAN FISHERIES EXPERT TO AID IN DEVELOPMENT OF FISHERIES ADMINISTRATION SYSTEMS: A visiting expert consultant on fisheries, Richard S. Croker, arrived in Japan on October 9, 1950, to begin a three-months' assignment with the Natural Resources Section of SCAP. Croker, who is Chief of the Bureau of Commercial Fisheries of the California Fish and Game Commission, is to assist and advise the Supreme Commander for the Allied Powers and Japanese Government officials in the development of a coordinated and unified fisheries administration program. He will determine whether the existing fisheries administration systems, including laws and regulations for enforcement at both national and prefectural levels, are contributing to the proper conservation of the aquatic resources of Japan.

The complicated systems of fisheries regulations which have evolved over many years have created overlapping authority by the national and prefectural governments and in many instances work against the common objective of utilizing aquatic resources fully on a sustained yield basis.

At the conclusion of the assignment, Croker will prepare a report including specific recommendations for improvement of the fisheries administration systems and regulations.

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OYSTER CULTURE: Oysters are a valuable food item in Japan for they provide many of the elements essential to a balanced diet. They are especially important to the Japanese, who lack adequate protein foods, according to SCAP's Natural Resources Section Report No. 134 (Oyster Culture in Japan)^{1/} recently issued.



DIVING FOR PEARL OYSTERS

Seventeen species of oysters have been recognized in the waters of Japan Proper, according to this report. Five species are used as food (Ostrea gigas, O. rivularis, O. denselamellosa, O. nippona, and O. echinata), but only O. gigas and O. rivularis are cultured commercially. O. denselamellosa has been cultured experimentally but not commercially. O. gigas is by far the most important of Japanese food oysters.

The culture of oysters in Japan started in the early 17th century, in Hiroshima Prefecture, which remained the center of oyster culture for nearly 300 years. Early culture procedures were simple, consisting of the sowing, stone, and bamboo stick methods. Although these methods are still used to some extent in various places, they have been largely supplanted by the modern hanging culture methods.

The hanging methods consist of the raft, long-line, rack, and umbrella modifications, each of which has its special advantage and is adapted to specific purposes or conditions. The hanging methods have proved much more efficient than any of the earlier systems, in growth rate and quality of the oysters and in total production per unit area. Because these methods utilize the middle stratum of water between the bottom and the surface where food organisms are especially abundant, the growth rate of the oysters has been greatly accelerated. When the oysters are hung vertically, the number that can be raised per unit area of sea bottom is greatly increased. Because contact with the sea bottom is avoided and the vertical position can be maintained at any desired level, many areas previously considered unsuited to oyster culture because of bottom type, water depth, or the abundance of parasites, become available and highly productive. Also, quality of oysters raised in clear sea water is better.

The export of spat of O. gigas from Japan is the basis for the oyster industry of the Pacific Coast of the United States and Canada. The export of spat on a commercial scale began in 1925 and continued until 1941 when World War II stopped the shipments. Export was resumed in 1946. During 1925-49, 585,156 cases of spat were exported. The United States and Canada have been the principal recipients of these shipments, with a total of 581,907 cases valued at \$1,869,285. The center of the spat export trade is Miyagi Prefecture, especially the Ishinomaki Bay area.

For domestic consumption the Japanese oysters are available on the market either raw or canned; the canned oysters are sometimes smoked. Domestic consumption during 1908-45 was 2,063,311 metric tons. Byproducts of the oyster industry are confined to the utilization of the shell, as chicken feed, paint, slaked lime, fertilizer, and medicines.

Both elemental and biological factors cause damage to the oyster. Elemental enemies are changes in water temperature, wind, and floods. Biological enemies are the red tide, oyster drills, starfish, internal parasites, and fouling organisms.

^{1/} ISSUED BY THE U. S. FISH AND WILDLIFE SERVICE AS FISHERY LEAFLET 383.

Norway

FISHERY BYPRODUCTS OUTPUT BEING INCREASED: The output of Norwegian herring oil plants is being boosted, according to an October 12 report from the Norwegian Information Service. In accordance with a large-scale expansion plan, drawn up by the Government's Directorate of Industries, total daily capacity will be increased by about 38,000 barrels of herring. Almost half of this increase will be accounted for by factories in the provinces of More and Romsdal, whose capacity is due to be stepped up by about 16,000 barrels of herring a day.

FISH LEATHER RELIEVES NORWAY'S LEATHER SHORTAGE: Leather for ladies' shoes, bookbinding, and brief cases is now being made from skins of cod and horned pout at the Norsk Havlaerfabrikk, in the northern district of Vesteraalen, Norway. Production so far is on a modest scale, but the high quality products of this plant will, nevertheless, do their bit to relieve Norway's persistent leather shortage.

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NORWEGIAN FISHING OFF GREENLAND SUCCESSFUL: Most of the Norwegian fleet of 24 vessels which has been fishing off western Greenland during 1950 has had a very satisfactory season, an October 26 news release from the Norwegian Information Service reports. It is estimated that the 1950 catch will total 12,000 tons of salt cod, or about twice as much as last year. The operators of the vessels are said to be well pleased with the results and it is estimated that the crews' share of the catch will amount to between \$700-800 per man.

Some halibut was caught, too. The Norwegian refrigerated vessel Kolastind brought about 200 tons of halibut from Greenland to New York--the first time in 25 years that Norwegians have tried to ship frozen fish directly from the fishing grounds.

FISHERMEN OUTFITTING FOR LOFOTEN FISHERIES: Fishermen are actively preparing for the Lofoten fisheries in northern Norway. Preliminary estimates indicate that tackle and other equipment worth 8-10 million kronurs (\$1.1-1.4 million) have been ordered so far.

Many fishermen are buying new seines and echo-depth sounders. Last year, seine fishing for ground fish was tried for the first time at Lofoten and the 100 seine gangs that were licensed by the Government showed excellent results. Expectations are that more licenses will be granted for the coming season.

ADVANCE SALES OF WHALE OIL: Almost two months before the start of the Antarctic whale season, the Norwegian whaling companies have made advance sales of whale oil totaling 60,000 tons. Half of the total quantity will go to the British Ministry of Food, and the other half to Norwegian refineries. In both instances, the advance price obtained was £100 (\$280) per metric long ton.



Norwegian companies will be expected to set aside 42,000 tons of whale oil for domestic consumption, according to the Norwegian Journal of Commerce and Shipping.

The Norwegian whaling company "Kosmos" has announced that its 1949-50 net profit was more than 14 million kroner (\$1,960,000) after setting aside well over 15 million kroner (\$2,100,000) for depreciation, and 11.4 million kroner (\$1,596,000) for reserves.

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DRIED FISH EXPORTS 1950: Norwegian exports of dried fish in 1950 will total approximately 15,000 metric tons as compared to an average of some 8,000 tons during each of the prior postwar years, the president of the Norwegian Dry Fish Exporters' Association predicts. Demand for dried fish on the world market is increasing. However, the 1950 Norwegian exports will fall far short of the prewar average of 25,000 to 28,000 tons per year, according to a September 29 American consular dispatch from Oslo.



Peru

COMPANIES PROCESSING FISH FOR EXPORT REQUIRED TO HAVE FISHING FLEETS: Concerns to be established in Peru for the purpose of processing fish in any form for export purposes must have their own fishing fleets, according to Supreme Resolution No. 342 of October 16, 1950, published in the official gazette El Peruano of October 30, 1950. The resolution also prescribes that no licenses will be granted for the operation of fish companies or the exportation of fish products unless the above-mentioned provision has been complied with.

The preamble of the resolution states in substance that this measure is taken in order to avoid interference from activities of fish-processing companies with the normal supply of fresh fish for domestic consumption, a November 1 American Embassy dispatch from Lima reports.

The Peruvian Bureau of Fisheries and Wild Life informally has indicated that this measure applies solely to new fish-processing companies to be established in Peru and not to those now in existence.



Republic of the Philippines

REPORT OF THE U. S. ECONOMIC SURVEY MISSION TO THE PHILIPPINES INCLUDES FISHERIES RECOMMENDATIONS: At the request of the President of the Philippine Republic, President Truman appointed a United States Economic Survey Mission to consider the economic and financial problems of that country and to recommend measures that will enable the Philippines to become and to remain self-supporting. The Mission surveyed in July and August 1950 all aspects of the Philippine economy (including fisheries), and gave special consideration to immediate measures to help raise production and living standards in the Philippines. In its report (submitted to President Truman and delivered to President Elpidio Quirino in October 1950), the Mission reports that "Economic conditions in the Philippines are unsatisfactory... Unless positive

measures are taken to deal with the fundamental causes of these difficulties, it must be expected that the economic situation will deteriorate further and political disorder will inevitably result." Summarized below are some of the recommendations and findings of the Mission regarding the fisheries and foreign trade of the Philippines.

Among the recommendations submitted by the Mission, are the following:

"That steps be taken to diversify the economy of the country by encouraging new industries;.....that the natural resources of the country be systematically explored to determine their potentialities for economic development;.....

"That to avoid a further deterioration in the international payments position and to reduce the excessive demand for imports, a special emergency tax of 25 percent be levied for a period not to exceed two years on imports of all goods other than rice, corn, flour, canned fish, canned milk, and fertilizer; that if such an emergency import levy is not possible under the Trade Agreement with the United States, either very heavy excise taxes should be imposed or a tax of 25 percent should be levied on all sales of exchange; that, as a safety measure, the present exchange and import controls be retained but their administration be simplified and liberalized and the full remittance of current earnings be permitted; that a Treaty of Friendship, Commerce and Navigation be concluded between the Philippines and the United States and the

present Trade Agreement re-examined in the light of the new conditions.....

"That the United States Government provide financial assistance of \$250 million through loans and grants, to help in carrying out a five-year program of economic development and technical assistance; that this aid be strictly conditioned on steps being taken by the Philippine Government to carry out the recommendations outlined by the Mission, including the immediate enactment of tax legislation and other urgent reforms; that expenditure of United States funds under this recommendation, including pesos derived from United States loans and grants, be subject to continued supervision and control of the Technical Mission; that the use of funds provided by the Philippine Government for economic and social development be coordinated with the expenditure of the United States funds made available for this purpose; and that an agreement be made for final settlement of outstanding financial claims between the United States and Philippines, including funding of the Reconstruction Finance Corporation loan of \$60 million."

For the fisheries, the Mission specifically recommends that "economic and technical assistance should continue to be furnished the (Philippine) Bureau of Fisheries. With the research already conducted by the (U. S.) Fish and Wildlife Service, a small staff of technical assistants would aid materially further development of the fishing industry."

In its analysis of the fisheries of the Philippines, the Mission points out that commercial fisheries (not including sustenance and pond fishing) in the Philippines have not restored production to the prewar level, but sustenance and pond fishing have recovered rapidly. However, the production of fishery products (including sustenance and pond fisheries) has increased from 170,000 metric tons in 1940 to 226,000 metric tons in 1949. The estimated investment in fisheries and ponds for the period 1945-49 was estimated at P35,000,000 (approximately \$17,500,000).

Further, the report states:

"The fishing industry, which is a major source of protein food in the Philippines, was demoralized following the Japanese occupation. Most of the commercial fishing had been in the hands of the Japanese and was almost totally destroyed. Local and pond fishing was sharply reduced by war damage and neglect.

"The Philippine Rehabilitation Act of 1946 authorized the U. S. Fish and Wildlife Service to cooperate with the Government of the Philippines in the rehabilitation and development of the fishing industry and to develop a program of conservation of the fishery resources in the Philippines and adjacent waters. A technical Fisheries Mission was sent to the Philippines, and with its aid all types of fishing in the Philippines made considerable progress. However, the authority of this Mission expired on June 30, 1950, and it

is feared that much of the progress made may now be lost. The Philippine Government has asked for a continuation of economic and technical assistance in the development of its fisheries and such assistance seems advisable in a program to expand food production.

"Commercial fishing has expanded rapidly in the postwar years. The number of vessels engaged in commercial fishing has been increased from 358 in 1946 to 826 in 1949, with more emphasis being placed on power boats than formerly. Despite this increase in vessels, the commercial fish catch (not including sustenance and pond fishing) is still only about half of prewar. In Philippine waters, the expansion in commercial fishing is limited by the small areas that have a sufficient fish population for economical operation. The technical Fisheries Mission found the most

likely areas for pelagic fishing to be in Sulu and Celebes seas and recommended establishment of a tuna cannery in southwest Mindanao. There are extensive areas for tuna fishing which were formerly fished by the Japanese, and the expansion of tuna fishing in these areas is feasible.

"Municipal and sustenance fishing has been given impetus by the high price of fish. Further expansion of this type of fishing appears possible through assistance to local fishermen in getting gear, by pro-

viding cold storage transportation to expand the market for fish, and through the development of freezer packers. Pond fishing is expanding rapidly, the catch of 1949 exceeding that of prewar years. It is estimated that up to the present only about one-fifth of the total possible areas for pond fishing has been developed. In order to stimulate this industry, a law was recently enacted permitting the sale of areas for pond fish development which had formerly been available only under lease."



Poland

PLANS LARGE-SCALE FISHERY IN NORTH SEA AND AROUND ICELAND: A large-scale fishery in the North Sea and around Iceland is planned by Poland, according to a September 19 American consular dispatch from Bremerhaven. Poland hopes to be given free port privileges either at Cuxhaven or in Denmark on the Skagerak. The trawler fleet for this fishery would be based in the free port and freighters would be used to haul the fish to Poland. Due to its location at the entrance to the Kiel Canal, Cuxhaven is an ideal location for such a free port.

Three Belgian-owned steam trawlers (Eduard Anseele, Nautilus, and Christ Mahlmann) have been sold to the nationalized fishery of Poland. These vessels, which were chartered by a Bremerhaven firm in 1949 and operated out of that port with German crews, have been returned to their owners, who in turn sold them to Poland.

In addition, negotiations now are underway to sell some of the 80 over-age German trawlers to the Polish national fishery. Many of these 80 over-age trawlers will be scrapped by the German owners at the end of the 1950 herring season unless other purchasers can be found. When sold for scrap, a 295 gross-registered-ton trawler will bring only DM 12,500 (\$2,975). Poland presumably will pay a much larger sum.



Spain

TIN-PLATE SHORTAGE AFFECTS FISH CANNING: Because the acute shortage of tin plate threatens a complete paralyzation of the Spanish fish canning industry, the Spanish Government has agreed to make \$125,000 available to the Fish Packers Association for the purchase of tin supplies abroad. The trade feared, however, that the measure has been taken too late to be useful during the present packing season, especially because of the difficulties existing in the tin plate producing countries as a result of government controls, an October 6 American consular dispatch from Vigo reports. Since the rolling mill at Bilbao claims to be unable to supply tin plate unless furnished with tin, packers have also been authorized to buy tin in the open market.

The acute shortage of tin plate experienced during the first part of October was temporarily solved by the arrival of German tin plate and the delivery of Spanish tin plate manufactured at Bilbao with refined tin supplied by the canners. While the

struggle for stocks of tin plate continues, there is now more optimism in the industry since German tin mills have accepted orders for delivery within the next few months. Local packers hope that substantial quantities of French tin plate will become available soon under the recently signed French-Spanish trade agreement.



Union of South Africa

SURVEY OF FISHING INDUSTRY PRESENTED AT SOUTH AFRICAN CHEMICAL INSTITUTE CONVENTION: The South African Chemical Institute Convention this year restricted its agenda to papers relating to the fishing industry, a September 28 American consular dispatch from Cape Town reports. The Convention was held on September 26 at that city. One of the papers presented at this Convention was "Survey of South African Fishing Industry with Special Reference to Fish Meal and Oil," by W. M. Neale-May, managing director of a South African marine-oil refining company. The following are some excerpts from this paper:

Fishing Areas: "The principal South African fishing grounds are to be found in two areas along the South African coast. The first and major portion consist of the continental shelf extending from Table Bay to the Kunene River Mouth; that is, the whole of the West African coast up to the Angola Border. The second portion is the continental shelf stretching from Danger Point to approximately Port Elizabeth. This area is on the South Coast, and is known as the Agulhas Bank. Apart from these two fishing grounds, there are no other areas of economic importance elsewhere on the South African coast...."

Production: According to the author, these fishing grounds would be capable of yielding an annual catch of about 500,000 short tons without being depleted. He states that present production totals about 250,000 tons....

"It can be concluded, therefore, that the physical and chemical conditions existing on our West Coast fishing ground are comparable with those of other established fisheries, and the presence of high densities of plankton of the correct type indicates that the fishery should be a very vigorous one." The author states that the following is the estimated production of the fisheries of the South African fisheries for 1950:

Principal Types of Fish Caught	Estimated Production for 1950 Short tons
1. Surface Netting:	
Pilchards (<i>Sardina sagax</i>)	125,000
Maasbanker (<i>Trachurus trachurus</i>)	25,000
Miscellaneous	2,000
2. Trawling:	
Hake (<i>Merluccius capensis</i>)	25,000
Sole (<i>Austroglossus pectoralis</i>)	2,500
Miscellaneous	5,000
3. Trapping:	
Crayfish (<i>Jasus lalandi</i>)	12,500
4. Trolling:	
Snook (<i>Thursites atun</i>)	8,000
5. Variety of other fish taken by other methods	15,000
Total	220,000

"The approximate present day value of this catch is \$4,000,000 (approximately \$11,120,000). Of these fish, those caught by trawling provide the bulk of the fresh, frozen fish eaten in the Union today. This fresh fish supply is augmented by the large variety of line-caught fish included under Item 5 above. Most of the line-caught fish are, however, consumed in the coastal towns, as opposed to the trawled fish which are sent in a frozen condition to the inland markets.

"The bulk of the crayfish is exported either as frozen tails or canned, and earns much needed dollars for the country. Almost all snook is dry salted and sold as such.

"Of the total catch of pilchards, about 10,000 tons will be canned in 1950. The balance of the pilchards, and virtually all the maasbanker, will be turned into fish meal and oil.

"The Fish Meal and Oil Industry: WHITE FISH MEAL: Production of this material first started in South Africa in 1937 when the disposal of offal and inedible fish from the trawling industry had become a problem. The first fish meal plant was established in the Cape Town Docks, and since going into production has produced 'white' fish meal from waste products of the trawling industry, i.e. hake, kabeljou, and miscellaneous ground-fish, offal, etc.

"Fish tissue with a low fat content is usually used in the manufacture of white fish meal, and for this reason it is only necessary to cook the fish tissue and dry it down to 8-10 percent moisture content to insure a suitable product. Some processes reduce the costs of evaporating the moisture by first subjecting the material to high pressure thus expelling a portion of the moisture present. Whichever method is to be used depends on the economics of pressing versus evaporation.

"Good white fish meal should have the following average analysis:

Crude protein.....	75 - 80%
Moisture.....	8 - 10%
Oil.....	1 1/2 - 3%
Digestibility factor.....	90 - 92

It will be noted that the percentage of fat in the meal is extremely low, and for this reason white fish meal does not develop rancidity. The quality of the protein is high, as indicated by the digestibility factor.

"White meal is used in the manufacture of balanced rations and concentrates for the animal feeding industry. The annual South African production is about 3,000 tons.

"An interesting series of experiments utilizing white fish meal made from cod and other non-oily fish has recently been conducted in Norway. White fish meal containing 70-80 percent protein was solvent extracted to remove any oil present and the resultant oil-free product finely ground and mixed to an extent of 7-10 percent with wheaten flour. The bakery products made from the mixture showed no noticeable change in taste. By paying particular attention to the selection of material from which the fish meal was made, it is claimed that up to 20 percent of this flour can be mixed with grain flour and the resultant mixture utilized in many bakery products without a fishy taste developing.

"If these claims can be substantiated, the advantages to South Africa are obvious. The considerable protein potential of the white fish meal industry of the Union could then be utilized to supplement the country's slender supplies of protein at a reasonable price. Valuable minerals such as lime, phosphate, and iodine would increase the value of the fish flour supplement in our wheaten products.

"**CRAWFISH MEAL:** According to van Rensburg (1948), the body of a crawfish represents between 65-72 percent of the total weight of the fish. In former years, all tissue other than the valuable tail was dumped as waste products. Recent legislation, however, now makes it illegal to dump this material, and it must now be dried and crushed to produce a meal well suited for poultry feeding. Because of the large proportion of mineral matter and fibre contained in the shell, the protein content is relatively low. However, for poultry feeding the high mineral content is desirable. Annual production is about 2,000 tons.

The following is an average analysis:^{1/}

	Minimum	Maximum	Average
Protein	29%	51.3%	39.6%
Moisture	3.5 %	11.6%	7.3%
Sand, salt, etc.	0.9 %	18.1%	9.5%

^{1/} 1949/50 REPORT OF THE FISHING INDUSTRY RESEARCH INSTITUTE.

"**OILY FISH MEAL:** The production of oily fish meal and fish oil today, is by far the largest section of the South African fishing industry. In 1945, the first experimental continuous reduction plant was built. This plant had a daily capacity of 20 tons of fresh fish.

"Today, approximately five years later, there are on the West Coast of the Union of South West Africa, twelve modern factories with a reduction-plant capacity equivalent to 3,000 tons a day. That is not to say that this large quantity of fish is

processed every day. On the contrary, owing to climatic conditions, the phases of the moon, variation in water currents, and to no small extent the moods of the fishermen, daily catches vary considerably.

"The fish, pilchard and maasbanker, are normally caught on the surface of the water at night during the dark of the moon. Fishermen, working from 40-ft. and 50-ft. boats, encircle the shoals of fish with long nets. The trapped fish are then brailled into the holds of the boats with baskets. The usual boat load is from 30 to 65 tons."

The author estimates that the 1950 South African mixed catch of pilchard and maasbanker sent to the reduction plants is estimated at 140,000 tons, which will yield about 26,000 tons of meal and 11,000 tons of oil.

"On arrival at the factory, the holds are flooded with sea water and the total contents pumped out by means of large pumps into large storage bins, holding from 150 to 300 tons each. On the way to the bins, the stream of fish passes over a continuous weighing machine. The rate of pumping is about one ton of fish per minute. An interesting feature about this method of unloading a boat is that although the fish pass through a centrifugal pump, surprisingly few are found damaged on discharge. This makes it possible for a cannery attached to a fish reduction plant to secure supplies of suitable fish from the main stream going to the reduction plant.

"From the storage bins, the fish are fed by mechanized conveyors into the reduction plant. There are different makes of plants in use in South Africa, but basically the processes are all the same. The first step consists of cooking the fish in continuous pressure cookers in order to break down the cells of depot fat and so release the oil from the tissue. The cooked meal is then pressed, and the oil and liquor (or stick-water) is separated from the remaining meal. The secret of making good fish meal rests with the cooking procedure, as incorrect cooking will lead to poor conditions in the press, and thus to poor separation of the oil from the meal. The oil and stickwater emerging from the press are sent to oil-recovery equipment, and the pressed meal containing about 50 percent moisture is first milled and then dried down to about 7 percent moisture content in continuous driers. After drying, the meal is again milled, air classified, and bagged.....

"Most South African presses are of the single or double-screw type, the screws operating in tandem against a perforated screen.

"The liquor and oil are forced through the perforated screen and the pressed meal emerges through an annular space at the end of the shaft. Modifications of this type of press employ knives or chains to prevent the meal from churning. In one design, two parallel screws were employed. However, none of the different modifications appear to be able to reduce the oil content of the dried meal below 7-8 percent.

"An entirely different type of press has recently been installed by two companies. This consists essentially of two large perforated disks, set at a slight angle to one another in the vertical plane, and rotating in the same direction. The cooked meal is fed in at the top where the distance apart of the disks is largest.

It travels downwards the rotation of the disks and in so doing is compressed as the disks approach each other at the bottom. The liquor and oil is discharged through the perforations, and a chute arrangement removes the pressed meal. Whether this type of press is an improvement on the usual type, under South African conditions, remains to be seen.

"Meal driers consist in essence of inclined rotating cylinders into which the milled wet meal is fed. In the case of direct heat driers, hot furnace gases pass concurrently with the meal down the inclined tube. By watching the humidity of the exit gases, some heat economy can be achieved by re-circulation, but this is not practised to any extent in the industry. The exit gases must be passed through cyclones to remove fine particles of meal before they are discharged into the air.

"Driers utilizing indirect heating are fitted with a series of steam-heated tubes round the internal periphery. The moisture in the meal is vaporized by the heated surface of these tubes, and the water vapor is drawn off by fan into a jet condenser.

"A recently installed plant utilizes an air-lift drier in place of the conventional rotary drier. The behavior of this type of drier is being watched with interest by the industry.

"The following results on the analysis of fish meal have been reported by the Fishing Industry Research Institute for the year April 1949-March 1950:

	Minimum	Maximum	Average
Protein contents.....	55.3%	73%	63.5%
Moisture.....	0.7%	13.9%	6.9%
Fat.....	0.4%	18.7%	9.5%

"The variation of the oil contents is extremely high. The difference between an oily fish meal and a white fish meal will be noted. The oil content of white fish meal is considerably lower and the protein content somewhat higher. The digestibility factor of the protein present in the oily meal has not been recorded for South African fish meals so far as I am aware, but it can be accepted that it varies considerably, dependent to a large extent upon the method of drying the meal. It is well known that overheating decreases the digestibility of the protein, and for this reason the meal produced in direct heat driers, whether fired by oil or coal, is probably inferior in this respect to the meal from indirect steam driers. Fish meal is sold on the basis of its percentage of crude protein. However, no allowance is made for the digestibility factor of the protein at present. As our farming community becomes more scientifically minded, premium prices will be paid for meals with high digestibility factors.

"CONDENSED FISH SOLUBLES: After the crude stickwater and oil have been expelled from the press, the mixture passes through a series of separating devices designed to separate insoluble suspended tissue, aqueous extract, and oil into three different products. The devices employed vary in different factories, and may consist of various combinations of settling tanks, foots reels, vibrating screens, bulk centrifuges, sludge discharging centrifuges, and polishers.

"Varying degrees of efficiency of separation are achieved; the recovered solids are fed into the meal

drier, the clear stickwater in most cases goes to waste, and the oil to storage.

"In one factory, however, the value of stickwater is recognized, and equipment has been installed for the production of condensed fish solubles. After discharge from the centrifuges, stickwater is run into large storage tanks and held at 180° F. or above. Sulphuric acid is added to adjust the pH down to about 4.5 and this coagulates a proportion of the soluble protein contained in the stickwater, and frees a small proportion of emulsified oil. The hot liquor then goes to separators for the removal of the precipitated oil and meal. The separated liquor is then evaporated in triple or quadruple effect evaporators to a 50-percent-solids consistency--the condensed fish solubles of commerce.

"Condensed fish solubles will usually have the following average analysis:

Total solids.....	50.0%
Fat.....	2-6%
Ash.....	8-9%
Crude protein (N x 6.25)...	33.5%
A variety of trace elements -	

"One ton of fresh fish yields about 170 gallons of stickwater. The total solids content of this water is seldom less than 7-8 percent, and may increase to 10-12 percent, depending upon the condition of the fish. The oil content varies between 0.8 and 1.0 percent.

"If we assume that in 1950, 100,000 tons of fish are treated by reduction plants not fitted with stickwater recovery units, we find that 5,959 tons of total solids plus 680 tons of oil have been fed back into the sea, if we take the lower figure of 7 percent. Since these solids contain 67-70 percent of protein, this is equivalent to fish meal being lost. This is about 30 percent of the actual amount of meal produced from 100,000 tons of fish, or alternatively, about 23 percent of the total potential meal taken from the sea is wasted. Valuing this meal at £30 per ton (about \$83)--a very low estimate in view of its high content of B vitamins and animal growth factors--and the oil at £60 (approximately \$167), at least £180,000 (\$500,400) of meal and £40,000 (\$111,200) worth of oil is being lost annually, a total of £220,000 (\$611,600). As a minimum figure, this is an enormous sum of money. If cooperative stickwater recovery units were erected at Helvis Bay, Lamberts Bay, Velddrif, and Stompneus, the investment would be recovered very rapidly and this enormous waste would be prevented.

"The whole problem of the efficient processing of fish to ensure that the valuable factors originally present in the fish, are retained in the meal, can be solved by carrying out the reduction in a totally different manner.

"In Norway, and recently in Iceland, plants have been installed for utilizing this process on herring. The fresh fish are fed into a large vacuum evaporator together with a predetermined amount of previously recovered fish oil. The evaporator has agitators and is steam heated. Moisture in the fish is evaporated off under maximum vacuum to the required point, and then the mixture of oil and dried fish tissue is passed to a solvent extraction plant where the oil is separated from the meal.

"The meal made by this method contains all the factors originally present in the fish, has a low oil content, and provided a low boiling solvent is used in the oil extraction, will have a high digestibility factor. The oil will probably be darker than that produced by the usual methods, but in other respects will be equal in quality. Yields of meal will be anything from 5-7 percent higher, and oil 2-3 percent higher.

"FISH OIL: Apart from the materials at present lost in the stickwater, the cleaning up of the oil at the South African factories is usually done efficiently. The moisture contents usually vary between 0.25 percent and 2.5 percent and insoluble impurities, etc., do not often exceed 0.10 percent.

"The smell, and to a large extent the color, of the oils are controlled by the degree of decomposition that has taken place in the fish before it is processed. Oils of bad odor, dark color, and high free fatty acid content are invariably the result of processing decomposing fish. Oils from very fresh fish are low in free fatty acid, lighter in color, and sweet smelling. The color of pilchard oil, however, even when produced from fresh fish is always appreciably darker than that of good maasbanker oil. The reason for this is the large amount of pigment found in the stomach walls of pilchards. The free fatty acid contents range from 0.5 percent in very good oils up to 7.5 percent in very poor oils. The average is slightly below 2.0 percent.

"The principal difference between pilchard and maasbanker oils lies in the degree of unsaturation of their fatty acids as shown by the iodine values.

Pilchard -185/200 by the Wye method
Maasbanker-158/170 " " " "

This property dictates the uses to which the oils are ultimately put. Maasbanker finds its principal use in hardening plants, where with the aid of activated nickel catalyst it can be hydrogenated relatively easily to produce excellent fats of both industrial and edible grades. These fats are being widely used in margarine and cooking fats, and in soap and candle manufacture. Pilchard oil, on the other hand, is much more difficult to hydrogenate than maasbanker. Not only does it require considerably more hydrogen, but the life of the catalyst is less.

"For these reasons, not much pure pilchard oil is hardened. Instead, it can be processed in a number of ways to produce excellent oils for the drying oil industries, such as paint and varnish oils, putty and core oils, printing ink varnishes, waterproofing compounds, etc. Both pilchard and maasbanker are used in the tanning industry in the crude and the sulphated state....."

In conclusion, the author points out that the South African fish meal and oil industry has made remarkable progress when one considers that it virtually did not exist four years ago. "Production will increase still further in the coming years and we can look forward with confidence to our industry becoming one of the major producers of meal and oil in the world," he says.

* * * * *

PRICES OF WHALE PRODUCTS FOR 1950-51 SEASON ESTABLISHED: A South African whaling company has entered into a contract with the British Ministry of Food stipulating a price of £100 (\$280) per long ton (2,000 lbs.), ex-ship United Kingdom port, for all whale oil produced by the company during the 1950-51 whaling season, an American consular dispatch from Durban dated October 11 reports.

It has also been ascertained that the agreed upon price for whale meat meal during the coming season will be 13/- (approximately \$1.82) per protein unit. The price realized for meat meal during the last season was 11/- (\$1.54) per protein unit.

While the new price to be paid for whale oil represents an increase of 25 percent over the price in effect last year, officials of the company point out that the cost of equipment, fuel, and other working costs have increased to such an extent that the margin of profit will not be increased as much as it might appear.



United Kingdom

BRITISH FISH MARKETING SURVEY: The Organization for European Economic Cooperation (O.E.E.C.) is conducting a survey of fish marketing in Great Britain. The comprehensive survey will cover the catching and distribution of fish, with the object of determining whether means can be found for increasing consumption, reports the October 14 issue of Fish Trades Gazette, a British fishery periodical.

The small panel of men which will carry out the survey will be drawn from countries which are members of O.E.E.C. Several of the main fishing ports and inland markets will be visited by the panel. The survey was to be completed by November 9.

* * * * *

WHALE OIL SOLD TO UNITED KINGDOM FOR \$280 PER LONG TON: The entire 1950-51 output of whale oil of the United Kingdom's largest whaling factory ship, the Balaena, has been sold on a forward basis to the British Ministry of Food, according to a report from the American Embassy at London.

The agreed price for the oil is £100 (\$280) per long ton. It is believed that since the sale involves the total production of the Balaena expedition (which produced nearly 45 percent of all the whale and sperm oil output of the three United Kingdom expeditions in the 1949-50 season) that the price may indicate the level at which other sales in 1950-51 will take place.



U. S. Trust Territory of the Pacific Islands

STATUS OF THE FISHERIES, 1949:^{1/} The commercial fisheries of the Trust Territory are developed to a very minor degree at this time, according to the annual report of the United States to FAO. Small amounts of bonito and other deep-sea fish are regularly taken from the waters of Saipan and the Palau Islands and some commercial catches of reef fish and crustaceans have been shipped from the Palaus. The fresh fish markets of Guam have been the only export market available for this fresh fish. Very little fish is processed in the islands for export.

Although appreciable quantities of trepang (beche-de-mer) are available, the only sizable markets for this product (China) have been closed. Trochus is taken in quantity for the shell most of which is exported to Japan to be manufactured into buttons.

The administration is continually studying methods to develop the deep-sea fisheries off the Trust Territory Islands. Lack of local skill and initiative, the necessity for heavy investment in fishing boats and processing equipment, and the distance from potential markets have consistently delayed progress in this field.

^{1/} ABSTRACTED FROM THE ANNUAL REPORT OF THE GOVERNMENT OF THE UNITED STATES OF AMERICA TO THE FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (SEPTEMBER 1950).



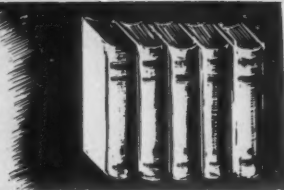
Venezuela

FISHING FLEET EXPANDED: The Venezuelan Development Corporation has announced that by mid-November, 30 new fishing vessels were scheduled to be completed, an October 30 American consular dispatch from Caracas states. These new boats have displacements of from 10 to 20 metric tons and will be used for marine fishing.





FEDERAL ACTIONS



Department of Commerce

COMMERCE FIELD OFFICES PREPARED TO PROVIDE GUIDANCE TO BUSINESSMEN ON NPA PROGRAMS: The 42 field offices of the Department of Commerce are now prepared to provide additional local guidance to businessmen on the programs of the National Production Authority as well as other Department programs, the Secretary of Commerce announced on October 23.

"We are making it possible for businessmen with production problems brought about by the re-armament program to find help close at hand. Unnecessary trips to Washington are not only expensive and wasteful for the businessman, but also add to the burden of our already strained economy," the Commerce Secretary stated.

"In most cases, the field offices will be able to answer specific questions regarding programs as they are put in effect," he said. "If any problems arise which are beyond the scope of the field offices, the directors of these offices can get answers quickly from Washington."

The Secretary's announcement followed a five-day meeting of Regional Directors of the Commerce Department at which they reported on economic and industrial activity in their areas and conferred with NPA officials on the administration of the NPA program for insuring adequate materials for defense with a minimum effect on civilian supply.

The National Production Authority Administrator told the meetings that, "Military needs must have a right-of-way, but that is only half our job. The other half is to expand to keep civilian production in high gear."

"We would like to increase production to meet civilian and military needs both right now. Unfortunately that takes time—a year or two in some cases. During this interval, we cannot add defense on top of our economy in all cases without taking some civilian consumption off the bottom."

NATIONAL PRODUCTION AUTHORITY

BASIC RULES OF THE PRIORITIES SYSTEM^{1/} AMENDED: The basic rules of the priorities system to be administered by the National Production Authority in the Department of Commerce, contained in Regulation 2, have been amended by the issuance of Amendment 2 to this regulation.

^{1/} SEE COMMERCIAL FISHERIES REVIEW, NOVEMBER 1950, P. 83.

Exclusion of wood pulp from the National Production Authority's basic priorities regulation was the main purpose of the amendment. As a result, no "DO" priority ratings may be used to obtain wood pulp.

This amendment was made because only 6 or 7 percent of United States consumption of wood pulp is available for purchase on the domestic market. Consequently, only this small quantity has been subject to "DO" ratings. The exclusion of wood pulp from the priorities regulation is designed to prevent disruption in the production and distribution of the several essential grades of wood pulp, NPA officials pointed out.

Wood pulp is the key raw material for paper, paperboard, rayon, cellophane, explosives, and thousands of end products necessary for both the defense program and important non-military uses.

Removal of the limited amount of pulp marketed domestically from the "DO" rating system gives some 400 or more small paper and paperboard mills access to it without seriously interfering with the pulp supply position of the integrated or importing mills.

NOTE: TEXTS OF THE NATIONAL PRODUCTION AUTHORITY REGULATIONS, INTERPRETATIONS, ETC., ARE AVAILABLE FROM THE NATIONAL PRODUCTION AUTHORITY, U. S. DEPARTMENT OF COMMERCE, WASHINGTON 25, D. C., OR FROM DEPARTMENT OF COMMERCE FIELD OFFICES.

PRIORITIES FOR CERTAIN CONTAINERS, PACKAGING, AND CHEMICALS: An interpretation covering the application of "DO" defense order ratings under the NPA priorities regulation to secure containers, packaging, and chemicals needed to fill defense contracts for food and petroleum was issued on October 24 by the National Production Authority.

Since provisions of the priorities regulation (NPA Regulation 2) do not apply to petroleum and food, "DO" ratings may not be applied to procure these commodities.

However, the interpretation (NPA Interpretation No. 1) makes clear that the Department of Defense and the Atomic Energy Commission may assign to their suppliers of petroleum and food the right to apply "DO" ratings as follows:

1. To secure the drums, cans, and other containers and packaging required for the delivery of petroleum and food.

2. To secure chemicals required for use, either directly in the production of, or in processing the petroleum and food and which will be consumed or converted into byproducts in the course of the processing.

The "DO" ratings may be used only to secure the minimum quantities of containers, packaging, or chemicals required to fill such defense orders.

For containers and packaging, for example, the Department of the Army places an order with a supplier for 100,000 cases of canned fish, which is a food product and is not covered by the priorities regulation. An authorized Army representative may, however, assign to the supplier the right to apply a "DO" rating to secure the packages or containers required for the delivery of the 100,000 cases of canned fish.

INTERPRETATIONS TO INVENTORY CONTROL REGULATION ISSUED: Three interpretations of its inventory control regulation were issued on November 14. The interpretations cover methods of adjusting orders, the extent of the imported materials exemption, and deliveries of goods through immediate distributors.

The inventory control regulation^{1/} (NPA Regulation 1, issued September 18, 1950) limits to a "practicable minimum working inventory" the quantities of a number of listed items which may be ordered, received, or delivered.

^{1/} SEE COMMERCIAL FISHERIES REVIEW, NOVEMBER 1950, P. 83.



Department of State

TERMINATION OF TRADE AGREEMENT WITH CHINA BECOMES EFFECTIVE: The President, on October 12, 1950, signed a proclamation terminating certain United States tariff concessions initially negotiated with China in the General Agreement on Tariffs and Trade concluded at Geneva, Switzerland, in 1947. This action was taken because of the withdrawal of China from the agreement effective May 6, 1950,^{1/} according to an October 13 press release from the U. S. Department of State.

Changes in the United States tariff rates resulting from termination of the concessions listed, will be effective on December 11, 1950, the sixtieth day following the issuance of the proclamation.

An exclusive trade agreement between the United States and Cuba, concluded at the same time as the General Agreement, provides that, under certain circumstances, United States tariff preferences on products of Cuba not included in the General Agreement shall be maintained at the margins that were in effect on April 10, 1947. Termination of the concessions to China will, in some cases, by removing the items concerned from the General Agreement, result in adding them to the list of Cuban products entitled to preferential treatment.

^{1/} SEE COMMERCIAL FISHERIES REVIEW, OCTOBER 1950, PP. 74-5.



Eighty-first Congress (Second Session)

NOVEMBER 1950

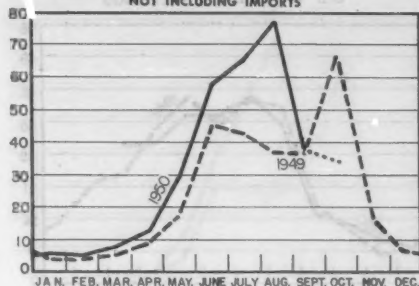
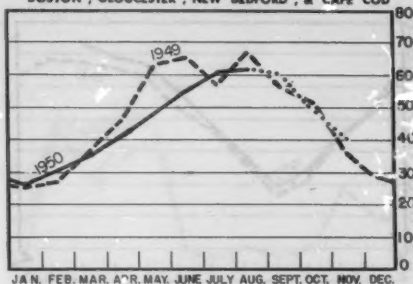
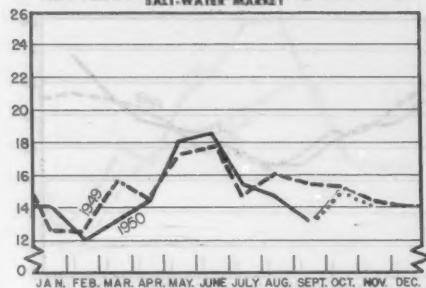
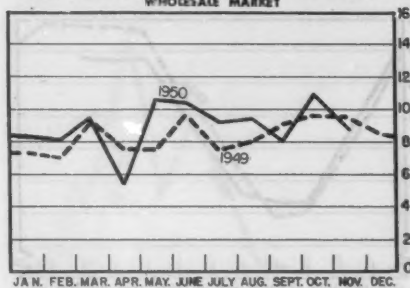
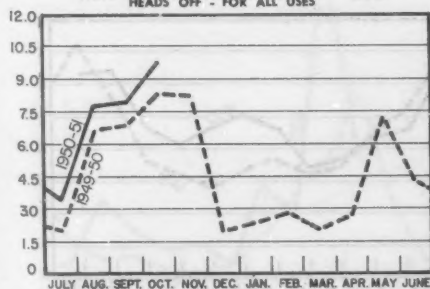
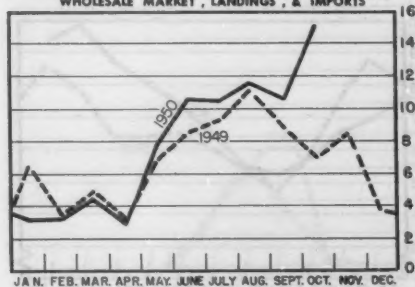
Congress reassembled on November 27 in continuation of the second session of the Eighty-first Congress.

No bills affecting the fishing and allied industries were introduced or passed in either the Senate or House of Representatives during the few days in November Congress was in session.



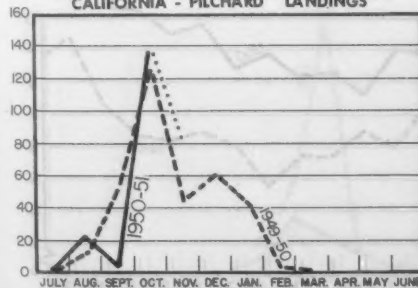
LANDINGS AND RECEIPTS

In Millions of Pounds

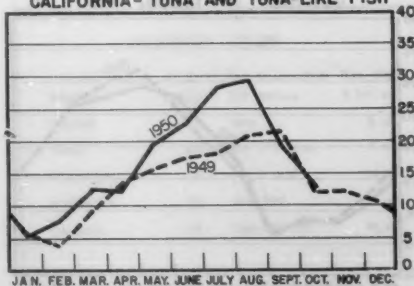
MAINE - LANDINGS
NOT INCLUDING IMPORTSMASSACHUSETTS - LANDINGS
BOSTON, GLOUCESTER, NEW BEDFORD, & CAPE CODNEW YORK CITY - RECEIPTS OF FRESH & FROZEN FISH
SALT-WATER MARKETCHICAGO - RECEIPTS OF FRESH & FROZEN FISH
WHOLESALE MARKETGULF - SHRIMP LANDINGS
HEADS OFF - FOR ALL USESSEATTLE - RECEIPTS OF FRESH & FROZEN FISH
WHOLESALE MARKET, LANDINGS, & IMPORTS

In Thousands of Tons

CALIFORNIA - PILCHARD LANDINGS



CALIFORNIA - TUNA AND TUNA-LIKE FISH

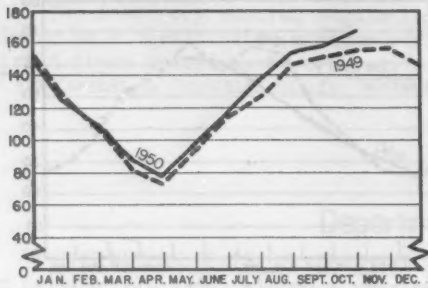


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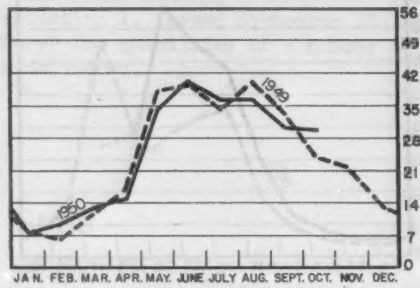
COLD STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS

In Millions of Pounds

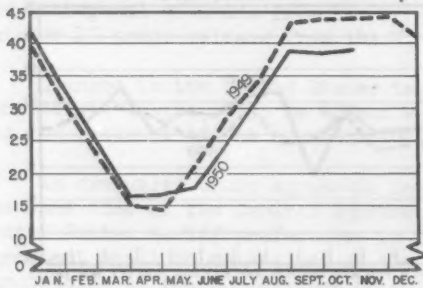
U.S. & ALASKA - HOLDINGS OF FROZEN FISH



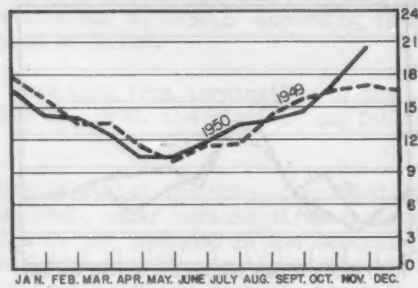
U.S. & ALASKA - FREEZINGS



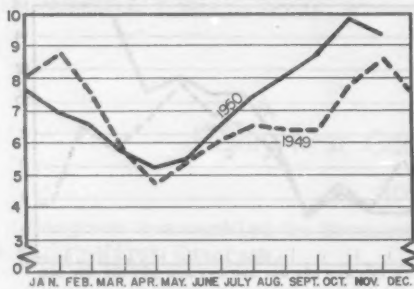
NEW ENGLAND - HOLDINGS OF FROZEN FISH



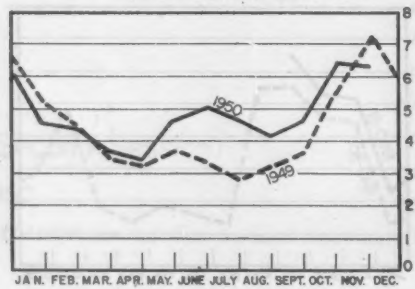
NEW YORK CITY - HOLDINGS OF FROZEN FISH



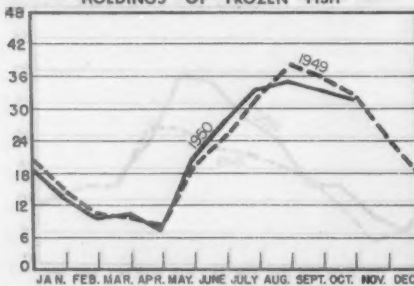
CHICAGO - HOLDINGS OF FROZEN FISH



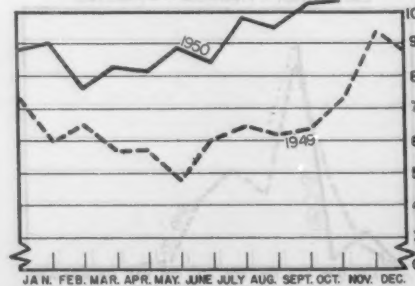
GULF - HOLDINGS OF FROZEN FISH



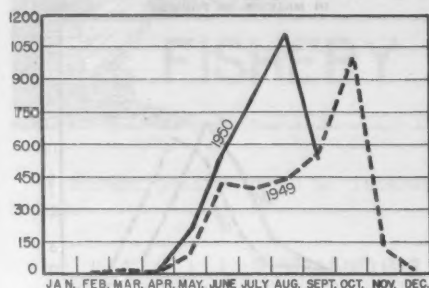
WASHINGTON, OREGON, AND ALASKA - HOLDINGS OF FROZEN FISH



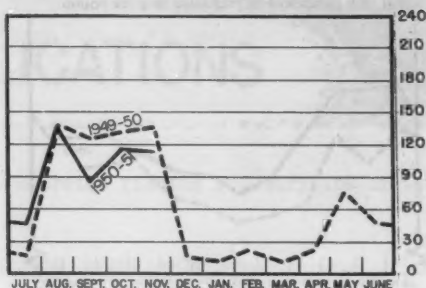
CALIFORNIA - HOLDINGS OF FROZEN FISH



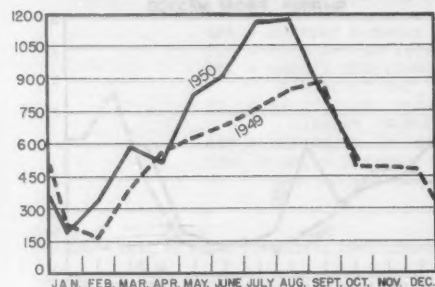
CANNED FISHERY PRODUCTS

In Thousands of Standard Cases
MAINE - SARDINES, ESTIMATED PACK

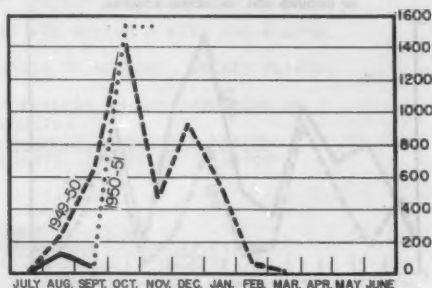
UNITED STATES - SHRIMP



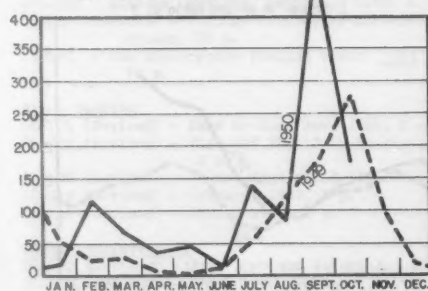
CALIFORNIA - TUNA AND TUNA-LIKE FISH



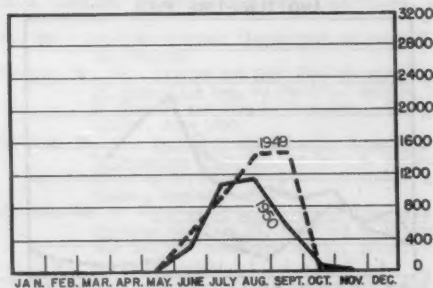
CALIFORNIA - PILCHARDS



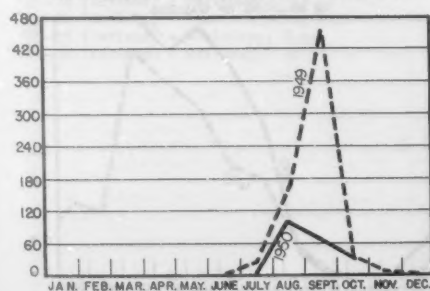
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ALASKA - SALMON



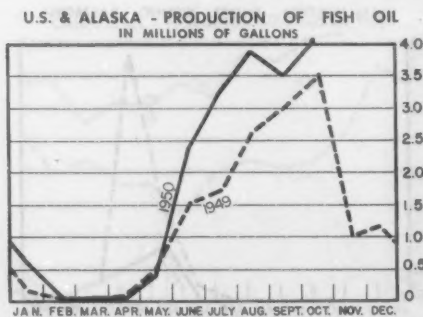
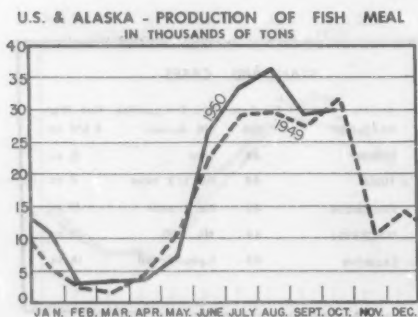
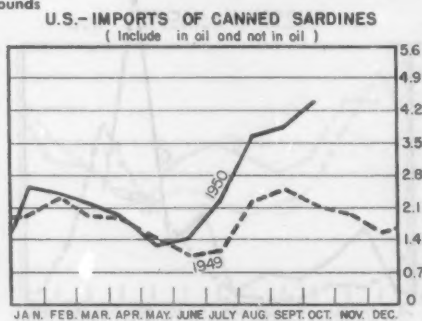
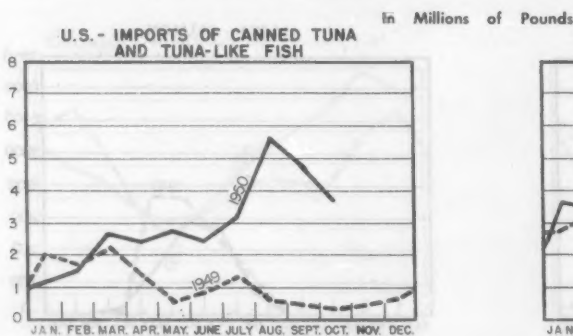
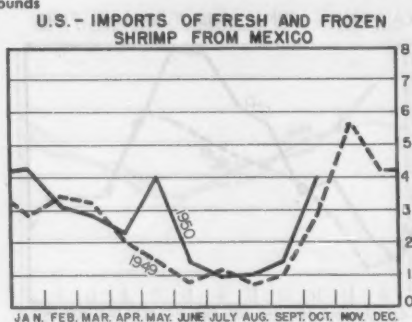
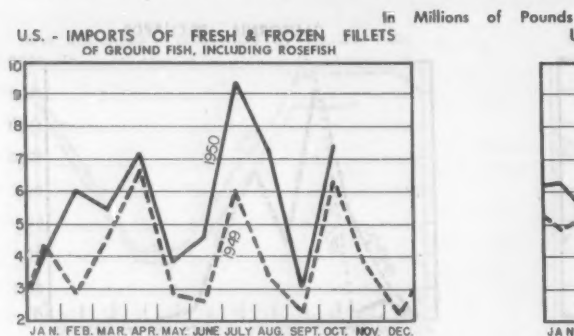
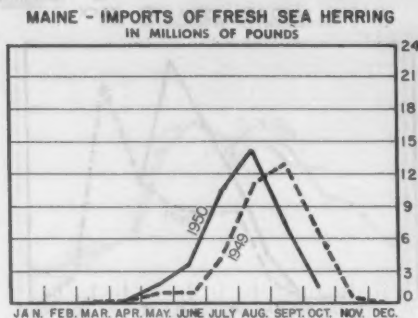
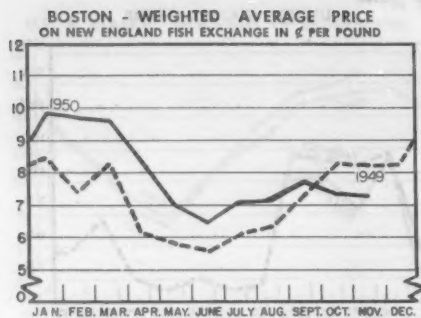
WASHINGTON - PUGET SOUND SALMON

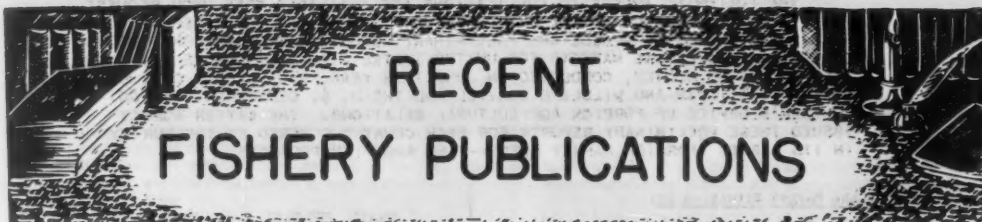


STANDARD CASES

Variety	No. Cans	Can Designation	Net. Wgt.
SARDINES	100	1/4 drawn	3 1/4 oz.
SHRIMP	48	—	5 oz.
TUNA	48	No. 1/2 tuna	7 oz.
PILCHARDS	48	No. 1 oval	13 oz.
MACKEREL	48	No. 300	13 oz.
SALMON	48	1-pound tall	16 oz.

PRICES, IMPORTS and BY-PRODUCTS





RECENT FISHERY PUBLICATIONS

Recent publications of interest to the commercial fishing industry are listed below.

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
- FL - FISHERY LEAFLETS.
- MDL - MARKET DEVELOPMENT SECTION LISTS OF DEALERS, LOCKER PLANTS, ASSOCIATIONS, ETC.
- SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
- SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
- SSR.-FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

Number	Title
CFS-580	- Pacific Coast Fisheries, 1948 Annual Summary, 8 p.
CFS-581	- Frozen Fish Report, October 1950, 10 p.
CFS-584	- Fish Meal and Oil, September 1950, 2 p.
CFS-586	- Middle Atlantic Fisheries, 1948 Annual Summary, 6 p.
CFS-587	- Alabama Landings, September 1950, 4 p.
FL-232 (Revised)	- Fishery Technology Abstract Card System, 20 p.
FL-385	- The Exploratory Fishing Vessel <u>John N. Cobb</u> , 11 p.

Firms Canning:

SL-106 (Revised)	- Shad or Shad Roe, 1949, 1 p.
SL-107 (Revised)	- Fish and Shellfish Specialties, 1949, 3 p.
SL-108 (Revised)	- Salmon Eggs for Bait, 1949, 1 p.
SL-110 (Revised)	- Cysters, 1949, 2 p.
SL-119 (Revised)	- Squid, 1949, 1 p.

Firms Manufacturing:

SL-153 (Revised)	- Fish Glue and Isinglass, 1949, 1 p.
SL-156 (Revised)	- Pearl Essence, 1949, 1 p.

Refrigerated Locker Plants:

MDL-6 (Revised)	- Kentucky, 4 p.
MDL-14 (Revised)	- California, 13 p.
MDL-22 (Revised)	- Massachusetts, 2 p.
MDL-27 (Revised)	- Louisiana, 2 p.
MDL-33 (Revised)	- Arizona, 2 p.

Number	Title
	<u>Refrigerated Locker Plants (Cont.):</u>
MDL-40 (Revised)	- Idaho, 5 p.
MDL-41 (Revised)	- Maine, 1 p.
MDL-42 (Revised)	- Maryland, 2 p.
MDL-43 (Revised)	- Alabama, 3 p.
MDL-52 (Revised)	- State School Lunch Supervisors, 4 p.
Sep. 260	- Japanese Skipjack (<u>Katsuwonus pelamis</u>) Fishing Methods.
SSR-Fish. No. 29	- <u>Injured and Dead Fish in the Vicinity of Bonneville Dam</u> , by Harry A. Hanson, Paul D. Zimmer, and Ivan J. Donaldson, 41 p., illus., June 1950.
SSR-Fish. No. 36	- <u>Survey of the Columbia River and its Tributaries--Part III</u> , by Zell E. Parkhurst, Floyd G. Bryant, and Reed S. Nielson, 103 p., illus., September 1950.
SSR-Fish. No. 37	- <u>Survey of the Columbia River and its Tributaries--Part IV</u> , by Floyd G. Bryant and Zell E. Parkhurst, 108 p., illus., September 1950.
SSR-Fish. No. 38	- <u>Survey of the Columbia River and its Tributaries--Part V</u> , by Reed S. Nielson, 41 p., August 1950.
SSR-Fish. No. 39	- <u>Survey of the Columbia River and its Tributaries--Part VI</u> , by Zell E. Parkhurst, 58 p., illus., October 1950.
SSR-Fish. No. 41	- <u>Oxygen Block in the Main-Stem Willamette River</u> , by Frederic F. Fish and Richard A. Wagner, 19 p., September 1950.

THE FOLLOWING PROCESSED PUBLICATIONS ARE AVAILABLE FREE UPON REQUEST FROM THE BRANCH OF COMMERCIAL FISHERIES, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. THESE ARE PRELIMINARY REPORTS GIVING INFORMATION ON CURRENT AND POTENTIAL MARKETS FOR UNITED STATES FISHERY PRODUCTS IN SOUTH AMERICA. THIS SURVEY, CONDUCTED IN JUNE THIS YEAR, WAS CARRIED OUT JOINTLY BY THE U. S. FISH AND WILDLIFE SERVICE AND THE U. S. DEPARTMENT OF AGRICULTURE'S OFFICE OF FOREIGN AGRICULTURAL RELATIONS. THE LATTER AGENCY ISSUED THESE PRELIMINARY REPORTS FOR EACH COUNTRY COVERED BY THE SURVEY IN ITS SERIES 'FOREIGN MARKET NOTES--FISH AND FISH PRODUCTS.'

Reports on the Market Situation in:

Argentina, FFP-1-50, 2 p., June 21, 1950.
Netherlands West Indies, FFP-2-50, 2 p.,
 June 28, 1950.
Uruguay, FFP-3-50, 4 p., June 29, 1950.
Paraguay, FFP-4-50, 2 p., July 31, 1950.

Brazil, FFP-5-50, 3 p., July 31, 1950.
Venezuela, FFP-7-50, 3 p., August 16, 1950.
Chile, FFP-8-50, 11 p., August 31, 1950.
Peru, FFP-9-50, 4 p., September 5, 1950.
Suriname, FFP-10-50, 3 p., September 5, 1950.
Ecuador, FFP-11-50, 13 p., November 1950.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Biometric Comparison Between Yellowfin Tunas (NEOTHUNNUS) of Angola and of the Pacific Coast of Central America, by Milner B. Schaefer and Lionel A. Walford, Fishery Bulletin 56 (From Fishery Bulletin of the Fish and Wildlife Service, Volume 51), pp. 425-43, illus., printed, 15 cents, 1950. In this report, measurements of various characters on 60 specimens of *Neothunnus* from Angola are compared with similar data for *Neothunnus* from the Pacific Coast of Central America, employing linear regressions or transformations which yield linear regressions of the several measurements against total length. Covariance analysis of the data shows marked differences between the two areas in relative growth rates of certain fins and body dimensions. There seem also to be differences in average number of finlets and in the position of the longest dorsal finlet, according to the authors. Pending further taxonomic studies, the Angola fish is identified as *Neothunnus albacore*.

(Lowe) and the Pacific fish as *N. macropterus* (Temminck and Schlegel).

Guide to the Classification of Fishing Gear in the Philippines, by Agustin F. Umalil, Research Report 17, 165 p., illus., printed, 40 cents, 1950. The author points out that one of the serious handicaps in the administration and management of the fisheries of the Philippines has been the lack of standardized nomenclature for fishing gear. This publication attempts to solve the problem. It is divided into five parts: the first presents a basic classification of fishing gear; the second is a key by means of which fishing gear can be identified and new terms for fishing gear can be properly classified; the third defines and illustrates various types of fishing gear; the fourth is a tabular classification of local Filipino dialect names; and the fifth is a glossary, including definitions of more than a thousand terms.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE AGENCIES ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE AGENCIES OR PUBLISHERS MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

Canned Foods in Human Nutrition, E. J. Cameron and J. Russell Esty, Editors, 264 p., illus., printed. National Canners Association, Washington, D. C., 1950. This bulletin provides a convenient and authoritative reference source on the nutritive values of commercially canned foods (including fishery products), their proper handling and preparation for use by the ultimate consumer, and their practical applications in meeting the optimum requirements of human nutrition. The three main sections of the bulletin deal with the modern concepts of nutrition, nutritive values of canned foods, and storage and utilization of canned foods. The appendix contains extensive tables on the nutritive value of canned foods. References are given for each chapter including a selected bibliography of 146 research papers and 32 compilations and reviews on the nutritive value of canned foods.

Field Book of Seashore Life, by Roy Waldo Miner, 888 p., illus., indexed, printed. G. F. Putnam's Sons, New York, N. Y., 1950. A compact manual of the more common invertebrate animals inhabiting the shallow oceanic waters of the Atlantic coast of North America from Labrador to the Cape Hatteras region of North Carolina. It is intended first of all for the layman who has become interested in the invertebrate sea animals; second, for the student whose attention is more seriously drawn to the life of the seas; and third, for the research worker as a handy reference book. Starts off with the simplest of animals; lists sponges; then on through crustaceans, snails, bivalves, octopuses, squid, sea stars, sea urchins, sea cucumbers; and ends with the protochordates.

Guide and Directory for Trading with Germany, 55 p., printed. Economic Cooperation Administration, Special

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE AGENCIES ISSUING THEM.

Mission to Germany, Frankfurt, Germany, June 1950 (Distributed by Office of Small Business, Economic Cooperation Administration, Washington 25, D. C.) This guide is intended to assist American business firms who wish to trade or expand their present trading relations with Western Germany. It contains a summary of economic information regarding Western Germany, together with data concerning German trade practices and regulations, particularly those relating to the import of goods from the United States financed with ECA funds. At the end of the manual are appendices showing names and addresses of agencies in Western Germany concerned with foreign trade and tables of principal German exports and imports (including fishery products).

Guide and Directory on Doing Business with Belgium and Luxembourg and the Belgian Congo, 131 p., with maps, printed. ECA Special Mission to Belgium-Luxembourg, 1950. (Available from the Office of Information, Economic Cooperation Administration, Washington, D. C.) This manual is intended as a current guide for the American businessman who wants to trade with Belgium, Luxembourg, and the Belgian Congo. Belgium and Luxembourg are united in an economic union (sometimes called "Belgolux"), and they constitute a single trading and financial area, and many Belgian importers also import for the Congo. These countries have been importing canned fishery products and fish oil from the United States. The manual points out that it is comparatively easy to trade with these areas since almost all trade is conducted by private business with a minimum of Governmental restrictions. It contains information on trading with Belgium and Luxembourg; on the nature of Belgolux imports from the United States; on import licenses and ECA financing procedure; and also summaries of general economic information about Belgium, Luxembourg, and the Belgian Congo. Annexed is a directory of Belgolux and Congo firms which are actual or potential importers from the United States.

Japanese Antarctic Whaling Expedition, 1949-50 (Statistical Summary), by William M. Terry, and Lt. Comdr. Francois Bourgois, Preliminary Study No. 41, 50 p., processed. Natural Resources Section, Supreme Commander for the Allied Powers, Tokyo, Japan, October 1950. (Reports may be purchased only in photostat or microfilm from the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.) A summarization of statistical and other data concerning Japanese whaling operations in Antarctic waters during the 1949-50 season is contained in this report. Included are data on production (catch, processing, products produced), biological composition of the catch, special biological observations, and numerous figures and tables.

"Netting Bait and Cannery Fish with the Aid of Lights," by Perke H. Young, article, California Fish and Game, October 1950, vol. 36, no. 4, pp. 380-1, printed. Division of Fish and Game, State Fisheries Laboratory, Terminal Island Station, San Pedro, Calif. This article describes the netting of bait and cannery fish with the aid of lights by the Los Angeles-harbor fishing vessels.

"Newfoundland, Labrador Fisheries Surveyed," article, Trade News, September 1950, vol. 3, no. 3, pp. 5-6, illus., processed. Department of Fisheries, Ottawa, Canada. This is a report of a survey of the fisheries of northeast Newfoundland and a section of the Labrador

coast carried out this summer by the Canadian Department of Fisheries. It describes the working conditions of the fishermen and the types of fisheries.

Fishermen's Knots and Nets, by Raoul Graumont and Elmer Wenstrom, 203 p., 218 p., printed, \$3.00. Cornell Maritime Press, New York, 1948. This book should prove helpful to commercial and sport fishermen. The well-illustrated knots and splices give an over-all summary of the many possibilities available in securing hooks, lines, buoys, harpoons, and traps. The portion of the book devoted to traps and to seines is an introduction to the various designs which may be applied to certain fishing conditions. The net-making and net-repairing section points out the basic details involved in the process of making and repairing nets. In general, this book covers ample material in tying knots and making up splices which is of help to all who are interested in various fields of fishing, whether it be commercial or sport fishing. Yachtsmen and professional seamen will also find many items which will assist them in their fields. Commercial fishermen and fishing gear supply firms will find it to their advantage to cover the section on the preservation and care of nets. By following the procedures mentioned on the care of nets, a much longer fishing life can be obtained from this type of gear. This book is a good compilation of information from private and government agencies on knots, splices, traps, seines and care of nets as used in certain fisheries. As a handbook, it would be of help to sport fishermen, persons who are considering entering the commercial fishing field, and others who are interested in fields related to fishing.

"A Preliminary Report on the Fishery and on the Biology of the Squid (*Loligo opalescens*)," by W. Gordon Fields, article, California Fish and Game, October 1940, vol. 36, no. 4, pp. 366-77, illus., printed. Division of Fish and Game, State Fisheries Laboratory, Terminal Island Station, San Pedro, Calif. According to this report, the present study of the fishery and the biology of the squid was undertaken to increase the previously fragmentary knowledge of this commercially valuable mollusk. The report discusses the history of the squid fishery on the West Coast, the composition of the spawning population, weight-length relationship, and spawning season.

Schedule A (Statistical Classification of Commodities Imported into the United States with Rates of Duty and Tariff Paragraphs; and Code Classification for Countries /Schedule C/; United States Customs Districts and Ports /Schedule D/; and Flag of Vessel Registry /Schedule J/, August 1, 1950), 294 p., indexed, \$2.50 to domestic subscribers and \$3.50 to foreign subscribers (rates include the supplemental bulletins and pages for a period of at least one year). Bureau of the Census, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, Washington 25, D. C., and may also be ordered from Department of Commerce field offices.) This edition of Schedule A is a reprint of the September 1, 1946 edition incorporating all of the changes which have been made by supplementary public bulletins since the 1946 edition was issued. The 1950 edition includes the modified rates of duty and changes in classification necessary to reflect concessions negotiated at Geneva, Switzerland, and at Amnezy, France, under the General

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Agreement on Tariffs and Trade dated October 30, 1947. This edition is printed in loose-leaf form and changes in the Schedule will be made by public bulletins and/or revised insert pages.

Small Boat Engine Manual, by C. Morgan Jones, 276 p., illus., printed, \$4.00. Cornell Maritime Press, Cambridge, Maryland, 1948. This Manual fills the small boat operator's need for general guidance in the installation, maintenance, and repair of mechanical equipment aboard small craft. Although the title indicates special emphasis on the boat engine itself, the author has included information on such equipment as propellers, heating systems, fire-fighting equipment, steering-gear mechanisms, etc. Maintenance and repair of both Diesel and gasoline engines are treated comprehensively but in a practical manner through the use of non-technical language that the average small-boat owner can readily understand. Some of the subjects covered are: choosing the right engine; cylinder blocks, crankshafts, connecting rods and pistons; valves, camshafts and timing gears; carburetors; electrical systems; storage batteries; transmission systems; Diesel fuel injectors, pumps, nozzles, and blowers; auxiliary power plants, and miscellaneous equipment. The component parts of both types of engines are discussed, and pointers on repair and adjustment of the individual parts are given. An entire section of the Manual is devoted to "trouble shooting," which should be particularly helpful to the small-boat owner in diagnosing ordinary causes of motor failure when assistance from a mechanic is not available at sea. The Manual is well illustrated and should prove valuable to commercial fishermen who are operating small boats as well as to operators of small pleasure craft.

A Survey of the Capacity of Cold Storage Warehouses in the United States as of October 1, 1949, 33 p., (with tables and graphs), processed, free. Marketing Facilities Branch, Production and Marketing Administration, U. S. Department of Agriculture, Washington 25, D. C., September 1950. This survey is the fifteenth of a series of biennial space surveys issued since 1921 and covers 1,849 plants. Included in this report are data on the refrigerated storage capacity in the United States by geographic regions, by states, and by cities.

Work of FAO 1949/50 (Report of the Director-General), 91 p., printed. Food and Agriculture Organization of the United Nations, Washington, D. C., October 1950. This is the fifth annual report of the Director-General of the Food and Agriculture Organization of the United Nations for the period (nominally) June 30, 1949-July 1, 1950. Though there was no regular session in 1950, and the Special Sessions which did convene had no commission to review the technical work, this report was prepared for the information of governments and the public. The report consists of a Foreword, "FAO Yesterday and Tomorrow," which is a brief review of some outstanding achievements of the first five years of FAO and an analysis of its present position in the light of recent world events. Part I is an account of important "Organization-wide Developments" during the year. Part II contains the "Work of the Technical Divisions," and the section on fisheries in this part explains the FAO fisheries program and the various activities of the organization. Included among the discussions of the activities are the Fisheries Bulletin; a handbook on

"Pond Fish Culture Practices in Southeast Asia;" fishing methods and gear; commodity studies, cataloging of research and educational institutions; survey of the world's fisheries resources; statistical services; standardization of names; commodity standards; regional fisheries councils; consulting services; technical meetings; Technological Abstracts; Standing Advisory Committee on Fisheries; and co-operation with other organizations. An appendix containing miscellaneous data is also included.

World Fisheries Year-Book and Directory 1950 (Incorporating the North Atlantic Fisheries Year-Book and the Herring Exporters Manual), edited by Harry F. Tysser, 520 p., printed, illus., \$1 (approx. \$2.80). British-Continental Trade Press Ltd., 222 Strand, London, England, 1950. This book consists of two main parts. The first part contains articles on various subjects of interest to the fisheries and fish-processing industries and trades. The second half of the book is a directory that lists names; addresses, and other particulars of firms in eight branches of the industry, grouped by countries (includes about 5,000 firms in 68 countries). Includes exporters, curers, quick freezers, trawler owners; importers and wholesalers; fish canners and preservers; firms manufacturing and handling machinery and equipment for processing, refrigeration, packing; firms handling packing materials; ship-builders and repairers; firms handling nets and cordage, instruments, etc.; producers of fish byproducts—meal, oil, vitamins, etc.; and cold storage and transport companies. It also gives a list of trade marks and names; and a buyers' guide (classified list of advertisements). Some of the articles included are: Progress in Quick-Freezing; Sales Promotion in America; The Work of the International Council for the Exploration of the Sea; Arctic Fishery Research; The Echo-Sounder and Fishing; Sardine Canning Methods; Trends in Fish Oil Technology; Processing of Fish (Interesting New Machinery Developments); Fishing Vessel Construction; Radio Equipment for Fishing Vessels; Airborne Seafoods; as well as articles on the fisheries of specific countries. This book also contains a list of fish species on the markets; organizations and trade associations; trade journals of interest to the fish trade; and a dictionary of fish names in English, French, German, Norwegian, Danish, Swedish and Dutch, with scientific names.

World Outlook and State of Food and Agriculture--1950, 81 p., processed. Food and Agriculture Organization of the United Nations, Washington, D. C., October 1950. In line with recommendations of the Fifth Session of the FAO Conference, this report brings together information on the general world economic outlook; the outlook for individual farm, forestry, and fisheries commodities; the changing patterns of world trade; the changes in international investment; and the general state of food and agriculture. The section on fisheries products discusses 1949 production and marketing trends for fresh and frozen, salted, and canned fish, and oils and meals.

Trade Lists

The Commercial Intelligence Branch, Office of International Trade, U. S. Department of Commerce, has published the following mimeographed trade list. Copies of this list may be obtained by firms in the United States from that office or from Department of Commerce

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field offices at \$1.00 per list.

Feedstuffs - Importers, Dealers, Manufacturers and Exporters--Union of South Africa, 10 p. (October 1950). This list gives the names,

addresses, and products handled by importers, dealers, manufacturers and exporters of feedstuffs. Includes those handling fish meal and oil, crayfish meal, and whale bone meal.



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Illustrator-- Gustaf T. Sundstrom

Compositors-- Jean Zalevsky, Carolyn Wood, Betty Coakley

"S.S. PACIFIC EXPLORER"

PART V--1948 OPERATIONS IN THE NORTH PACIFIC AND BERING SEA

Fishery Leaflet 361, S. S. Pacific Explorer, Part V--1948 Operations in the North Pacific and Bering Sea, reports on the crab canning, fish filleting, and waste reduction operations conducted aboard the American factory ship Pacific Explorer in 1948. This ship was a development resulting from the need for additional sources of protein foods during wartime.

This 161-page publication discusses in detail the fishing operations, crab-processing and fish-processing activities, and the reduction of fish aboard the vessel. Included is a general description of the activities of the whole operation in the North Pacific and Bering Sea, general operating requirements, working agreements, and personnel facilities. Several appendixes contain a summary of the charter agreement, description of the fishing gear, fishing technique, crab-processing formula, abundance and condition of king crabs and fish in the various localities fished, and individual tow records for the otter trawl and the tangle net. There are also a number of tables which include season landings of the Pacific Explorer fishing fleet (by vessel and month), daily landings aboard the Pacific Explorer, fish filleting recovery aboard the factory ship, productivity per man-hour, crab-line production data, and other detailed information.



PACKING TABLE ABOARD THE S. S. PACIFIC EXPLORER

In addition to the operations in the North Pacific and Bering Sea, the Pacific Explorer fished for tuna during part of 1947 in the waters off Central and South America. Four reports were published describing this operation. Part I, giving

the factors considered in the conversion of the ship and a general description of the arrangement of the vessel, was published in the January 1947 Commercial Fisheries Review and has been reprinted as Separate No. 161. Part II, on suggestions for operators of tuna-receiving ships, was issued as Fishery Leaflet 301. Part III, on the structure of the ship and the refrigeration system, was issued as Fishery Leaflet 316. Part IV, describing the movement of the catch through the various handling places on the ship, the transfer of supplies to the fishing vessels, and the personnel involved, was issued as Fishery Leaflet 326. Copies of all or any of these publications are obtainable free upon request from the U. S. Fish and Wildlife Service, Washington 25, D. C.

Michigan.

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